

# Electric Railway Journal

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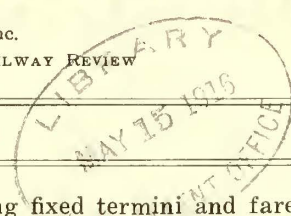
No. 20

**STORED COAL AFFECTS BUSINESS CONDITIONS** The large quantity of coal stored by industries throughout the Central West in anticipation of the biennial miners' strike period has seriously reacted on business conditions. A temporary depression prevails, and it is being particularly felt by the street and inter-urban railways in the coal fields. Prior to April 1, all of the mines were operating to capacity in order to supply the demand for coal for storage purposes, and since that time most of the mines have been practically shut down. In central Illinois, where the conditions in the coal mining industry largely control business conditions, this financial depression is being especially felt. Relief is expected soon, however, because the quantity of coal in storage is being rapidly exhausted. Another result of this wholesale buying of coal for storage purposes is the marked reduction in the fuel value of the coal purchased. As a rule, most of the large coal consumers are operating on a heat-unit-basis contract, but when the demand was great for coal just prior to April 1, coal of all kinds was purchased on a large scale. This in turn increased the cost of fuel at the boiler because, in many cases, additional rehandling was necessary, and the departure from a fuel-value standard reduced the efficiency of the fuel when it was used. Some of the larger companies have adopted the practice of buying high-grade coal in large quantities and carry it in storage at all times. This permits the making of better contracts, and when high-grade fuel is available it may be purchased in large quantities. This plan of buying fuel also has made it possible to utilize the sub-aqueous storage pits which were designed primarily for the storage of screenings. These screenings, by the way, are no longer a drug on the market.

**ENFORCING JITNEY REGULATIONS** That legal restrictions without enforcement are not very effective is rather a trite statement, but it is one of great present interest to electric railways in Pennsylvania which are still struggling with jitney competition. As part of the discussion at Lancaster before the Pennsylvania Street Railway Association brought out, the legal question in this State has been partly cleared up through the recent decision in the Scranton case, making jitney lines with fixed termini and fixed rates common carriers and requiring them to secure certificates of public convenience and necessity. This, of course, is a manifestly proper protection of the existing electric railway investment, but there seemed to be some question as to whether the decision is broad enough to cover irregular jitney operators as

well as those having fixed termini and fares. Counsel for the railways assert that even the wildcat jitneys must under the decision secure certificates before operating, but such jitneys are running in defiance of the commission's order and the commission has not yet acted upon the numerous complaints filed with it. Upon the warrantable assumption that the opinion of the commission covers all jitney competition, for the justice of protecting electric railway investment is the same whether the unfair competitor is regular or irregular, it becomes evident that the Pennsylvania railways are face to face with the serious problem of how to put the commission's ruling into practical enforcement. The commission has no police powers, and the punitive provisions of the regulatory act provide for only the long and expensive process of certification of complaints to the attorney general for prosecutions. When it is considered that the Scranton Railway has entered about 50 complaints and the Wilkes-Barre Railway about 250 complaints against jitneys operating without authority, the practical importance of the point is apparent.

**SUGGESTION FOR CO-OPERATION** Jitney competition was unknown when the Pennsylvania regulatory law was passed, and it is not strange that the commission should go slow in laying down precedents along new lines, but ultimately, we believe, the commission will be obliged to treat the question in a broad-minded manner and assume the proper supervisory power. The burden should not be placed on the railways to discover violations of commission regulations; the commission should ascertain such facts through its own inspectors, and then devise some simple means of rapidly and effectively enforcing its rules. We are of the opinion that a plan of co-operation with the State Highway Department, mentioned by Mr. Fairchild, would probably offer the simplest solution. The Public Service Commission has just taken a praiseworthy step in issuing a general rule stating that its certificates of public convenience for auto-buses or jitneys will be limited "to the route and number of cars and particularly to each automobile or auto-bus designated in the certificate," and that cars authorized to be common carriers must have painted on each side the name of the person to whom the certificate is issued, the word "auto-bus" and the number of the certificate. With rules thus specified, it should be a comparatively easy matter for a commission inspector to determine cases of violation, and if these are persisted in, an attempt should be made to secure a revocation of the state auto license through the State Highway Department. It does



not seem as if this body would countenance continued violations of regulatory rules, and the removal of the auto licenses would put the matter under State law right up to the city police. The Pennsylvania association has now authorized a committee of three to stand ready to co-operate with regulatory bodies in any way possible, and we believe that along the line of explaining the present contempt of jitney drivers for the public service commission's orders and of bringing this commission, the State Highway Department and the railways to a simple working plan, lies an opportunity for real constructive work by such a committee.

#### STANDARDS MUST REDUCE PRICE OR HASTEN DELIVERY

General apathy appears to pervade the industry in so far as the advantages of using standards is concerned. Whether this condition is the result of what may be termed professional jealousy, a lack of information, or because the specifications and standards are unsatisfactory is what the campaign launched by the standards committee of the American Electric Railway Engineering Association should determine. At the March meeting of the Illinois Electric Railways Association, H. H. Adams, chairman of the committee on standards, upon invitation called this association's attention to this condition as regards the standards, and urged their more general use. It is our understanding that this message will be "carried to Garcia" throughout the country with a view of determining the cause of the lack of interest. Doubtless a campaign of this kind will produce some results, and we are inclined to believe that there are other ways which should also be pursued which would enable the standards committee to present a more compelling argument to the industry than simply that of duty.

No one questions the advisability of using standards, particularly in the electric railway industry, where so many small companies are involved and numerous small orders for materials are constantly being placed. On the other hand, there arises in the minds of those responsible for specifying material the question of what particular advantage is it to them to adopt a new standard, particularly if the results obtained from manufacturers' products have been entirely satisfactory. This form of reasoning, doubtless, more than any other cause, is responsible for the limited use of association standards. It is this argument that a standards committee must overcome if it desires to make its campaign for the more general use of standards productive of results. We are of the opinion that the most forceful way to meet this contention is to determine what reduction in price manufacturers would give if a certain per cent of the entire industry adhered to the association standards. In other words, the principle of collective buying may be applied, and competition among the manufacturers of standard materials is certain to obtain reductions in price.

It is perfectly natural that the electric railway industry, as all other industries, should judge value by price

and quality. It cannot be claimed that standard dimensions will materially prolong the service life of a certain product so that a reduction in price, perhaps, accompanied by prompter delivery, are the inducements that must be offered to influence the more general use of standards. In order to bring this subject to an issue at the coming convention we would, therefore, suggest that the standards committee circularize the electric railways of the country to determine how many of them would adopt the association standards and what reduction in price, if any, the manufacturers could make with a wider adoption of standards. With this information, some idea of the total annual requirements for any standard would be obtainable, and upon that basis, doubtless, some price concessions could be obtained from manufacturers. It would at least be possible for an estimate to be made of the reductions which would be possible from such standardization. This would afford a starting point for a real movement in favor of standardization.

#### DEFINING THIRD-PARTY LIABILITY

An important decision in the matter of third-party liability under workmen's compensation laws was recently rendered by the Appellate Division, Third Department, New York. In the case in point (157 N. Y. Supp. 948), an industrial workman, injured in the course of his work while driving across electric railway tracks, executed a release to the railway, without compensation or any consideration whatever, and then elected to take compensation under the act from his own employer. He filed a claim according to law with the State Industrial Commission, and an award was made against the casualty company in which the employer was insured. The employer and the insurance company then appealed to the court from the commission's decision, the sole question involved being the effect of the release on the injured man's right to the award made against the insurance company.

The New York statute provides that a workman injured through the negligence of a third party shall elect whether to take compensation under the act or to pursue his remedy at common law against the third party. In the present case it does not appear that the electric railway was guilty of negligence, but the court holds that independent of this fact or whether the claimant received any consideration for the release, the statute does not permit the execution of a release to be construed as an election of suit against the third party rather than the taking of compensation. The claimant was justified in seeking a compensation award, and his cause of action, if any, against the railway was transferred to his employer's insurer. Moreover, according to the statute, any compromise or release by the injured man with the third party for less than the compensation provided by the act would be ineffectual against the insurer without the written approval of the latter.

In other words, the court avers, the purpose of the statute is to make the third party ultimately liable for the consequences of his negligence if such liability ex-

ists, and the employer or his insurer is to have the benefit of such liability to the extent of the compensation award. On the other hand, the statute provides that the third party shall receive credit in case of ultimate liability for any amount paid to the claimant for the release. If he has compromised for less than the actual liability, he then remains liable to the employer or his insurer for the difference up to the amount allowed under the statute. Although the present case concerns only the election of the compensation award, the court completes its argument with a portrayal of the other side, namely, when the claimant really elects his common-law action against the third party. In such event even the obtaining of judgment against the third party might not, under the statute, discharge the insurer. If the recovery were less than the amount for which the statute provides, the insurer would still be liable for making up the deficiency.

The case is mentioned here because of its effect on releases or settlements with injured persons. It is obvious that if the liability still holds, a railway company will gain little or nothing by rushing through a release from the workman of another employer unless the release has received the consent of the employer concerned. The general adoption of the compensation idea by state legislatures has enforced changes in the law of negligence which cannot be overlooked. The effect, as in this case, often extends beyond the actual employer, and the legal procedure of the claim departments should take this fact into consideration.

#### STRAPHANGERS DO NOT PAY DIVIDENDS

Service during the rush hour is always costly. In many cases it may actually be conducted at a loss. Manifestly, such conditions prohibit belief that "the dividends are in the straps"—an ancient fallacy, which may have been put forward originally by a railroad man, but which has caused more trouble to the industry than almost any of the other ill-advised catch-phrases of public utility history. That idea has been definitely proved false a number of times, but it might be well here to cite an example to show that if the electric railways could dispense with the rush hour and its inevitable straphangers, the alleged enormous profits of the business might be much nearer realization. Last week we pointed out that the cost of rush-hour service could be more than double that normally existing, but no consideration was given to the influence of the increased rush-hour receipts. This phase of the question will now be discussed.

For a typical case there may be taken the circumstances assumed in our last issue. Here a 14-mile round trip was considered, the schedule time being one and one-half hours, equal approximately to the duration of the rush period. By using the average figures displayed in the last electric railway census as a basis, a figure of 40 cents per car-mile was derived as the operating cost for the tripper cars, or those used only to handle the peak of the load. Since the duration of the peak here coincides with the assumed round-trip time for

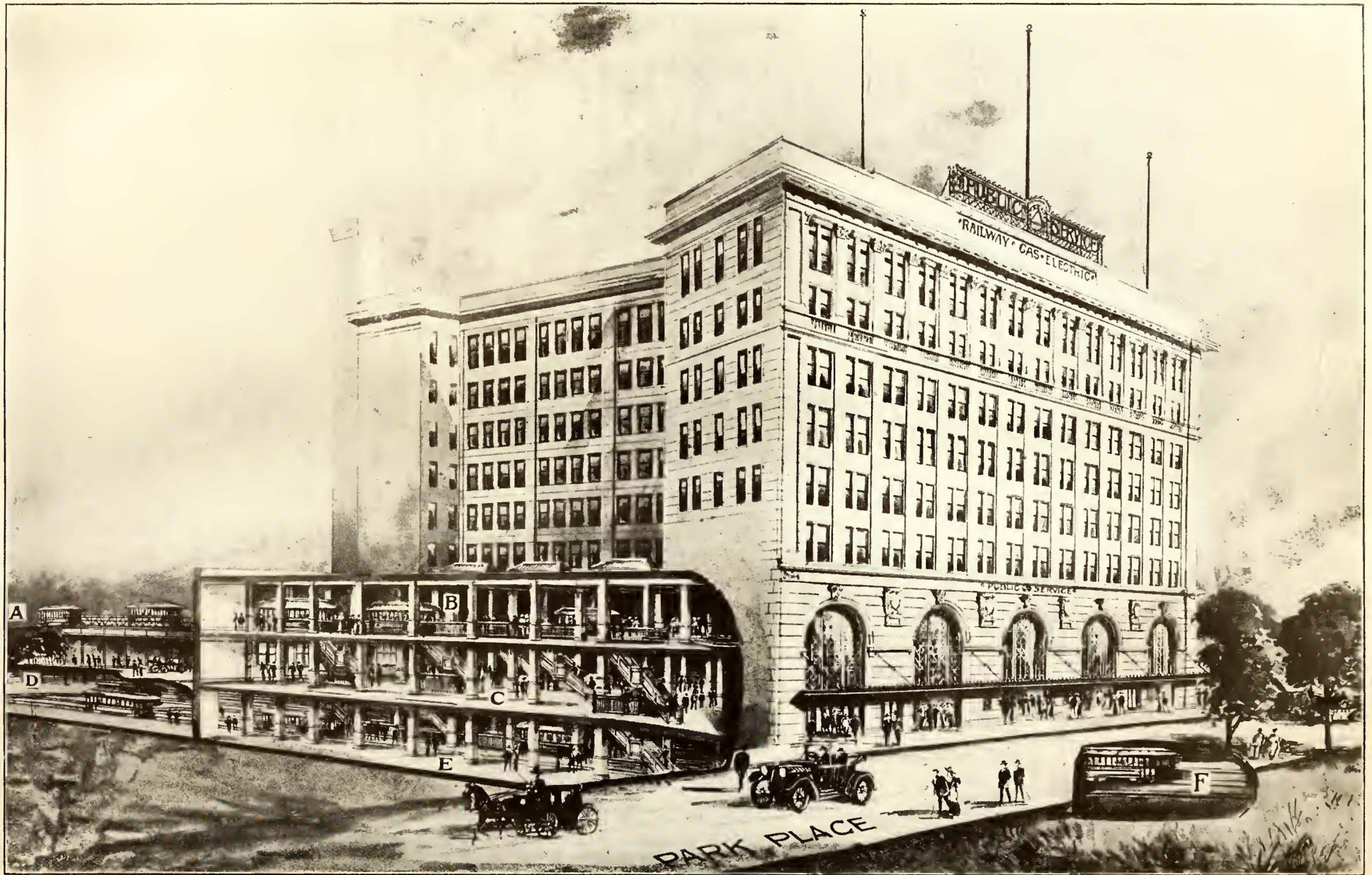
the run, most of the trippers would make only 14 miles daily, and this mileage, at 40 cents per car-mile, would make the daily cost per car \$5.60.

In this total there have been included both indirect and direct operating costs without taking into consideration any of the overhead charges involved by the existence of the tripper cars themselves. Each of these cars would be worth presumably \$5,000, and interest, depreciation and obsolescence at 12 per cent of this sum amounts to \$600 per car per year, or \$2 per day, if the car is in actual service 300 days out of each year. In addition, provision for carhouse and shop space must be made for every car that is owned, and the investment thus made is also productive of overhead expense. The latter has been estimated by B. F. Wood in a recent article in the *ELECTRIC RAILWAY JOURNAL* to be \$108 per car per year, or 36 cents per day, making a total for the two items of \$2.36. When this sum is added to the operating expense of \$5.60, the total cost of providing the car and making the daily trip during the rush hour becomes \$7.96 per car.

To balance this expenditure there are only the straphangers and, say, fifty other passengers who are able to secure seats. As the case herein assumed is an actual one, there are definite figures of loading to show the earnings of the individual car. These show that the seating capacity at the point of maximum loading is exceeded by 60 per cent, giving a load of about eighty, and that enough short-haul fares are picked up in addition to raise the register reading normally to 125 at the end of the out-bound trip. These conditions are, admittedly, unusually favorable for large gross earnings, but nevertheless, the receipts from the trip come only to \$6.25, against an expense of \$7.96, thus involving a clear loss of \$1.71 to the company for putting on each rush-hour car.

Of course, the receipts given above cover only the out-bound trip, although the car might accept passengers on its return in the other direction. The reason is that the in-bound traffic during the evening rush is almost invariably insufficient to load even the cars operated in the normal hours, conditions in the particular line in question providing no more than thirty in-bound passengers at the point of maximum load. So far as over-all receipts are considered, therefore, the in-bound tripper might just as well be run closed to the carhouse, except for the psychological effect, as the fares that are thus collected are merely taken from one of the regular cars.

Here, then, is a case where the provision of cars to carry the peak load leaves the company out of pocket on the operation. The straphanger, instead of paying dividends, has really cost the company money. If he could, by some miracle, be eliminated, or if the company could be absolved from the responsibility of carrying him, it would be greatly to the benefit of the railway's earnings. At the same time, perhaps, all the railways would escape the hounding to which they are now subject on the grounds of making money by hanging their patrons on straps.



Key: A, Elevated Structure over Pine Street; B, Elevated Train Floor; C, Concourse; D, Loop on Lower Level; E, Lower Level Train Floor; F, Subway.

Sectional Drawing of Public Service Terminal, Newark, N. J., Opened on April 29, 1916

# Signaling in the Public Service Terminal

To Secure the Greatest Safety and Rapidity of Car Movement, an Interlocking Signal System Was Adopted—Comprehensive Instructions, Explaining the System and Its Operation, Are Issued to Trainmen

By J. W. BROWN

Assistant Superintendent Public Service Railway, Newark, N. J.

WHEN cars began using the Public Service terminal, Newark, N. J., on April 30, 1916, a familiar figure in street railway work was absent. No switch boy, with his clanking iron, ran from point to point, directing cars into their proper tracks; instead the exhaust of compressed air and the flashing of red, yellow and green lights proclaimed the passing of the "switch-iron brigade." The determination to use centralized control of car movements in and out of the terminal was in keeping with the dominant thought, which governed the entire terminal plan, that only the best in modern construction and methods would enter into its erection and operation.

The general plan of the operating levels provided for a subway approaching from the west, the tracks entering the building on the lower level, forming a loop within it, and returning to the surface at Washington Street, some blocks distant from the loop. The concourse floor at the street level provides space for ticket offices and the usual station appointments, while on the second floor, or upper level, tracks were laid to accommodate all cars coming into the building from the east. The diagram on page 892 shows the track layouts in the building on both lower and upper levels, together with their approaches.

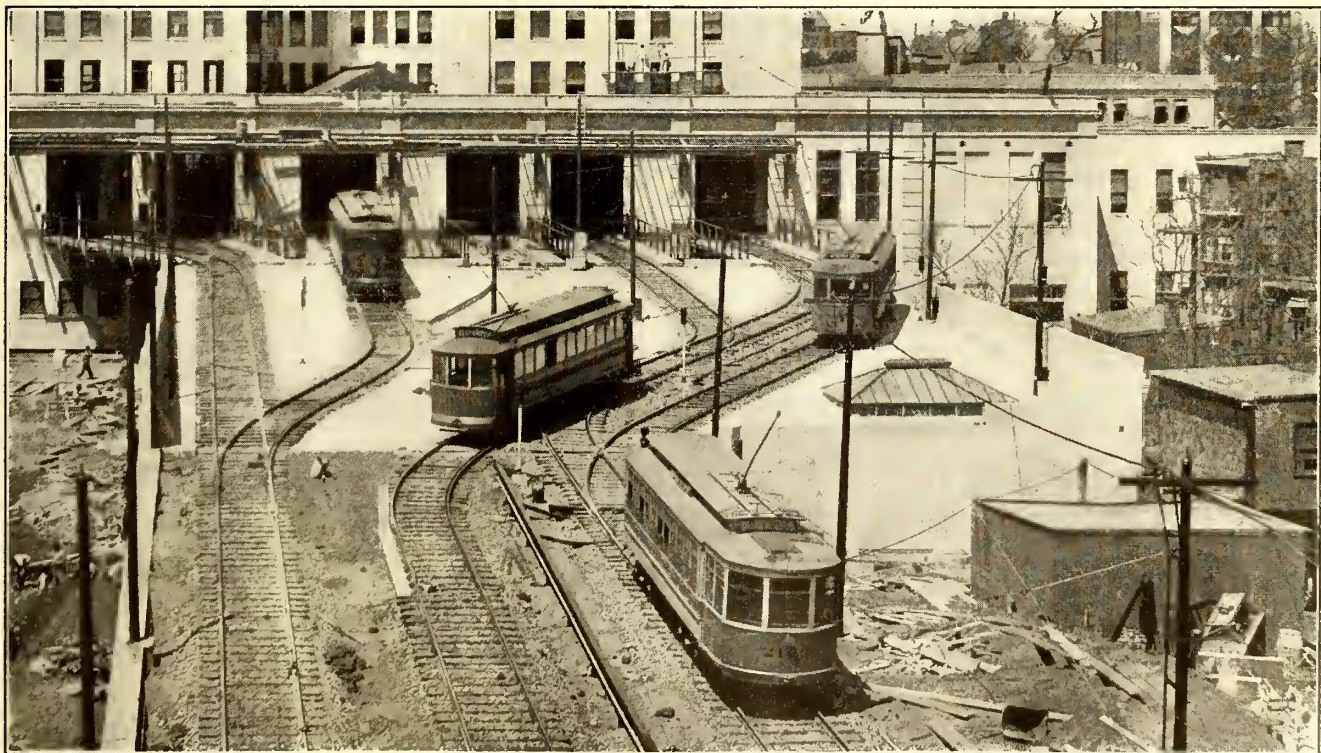
## THE TERMINAL'S UNIQUENESS IMPOSED NEW PROBLEMS

The entire absence of any similar terminals in surface line operation made necessary the solution of many

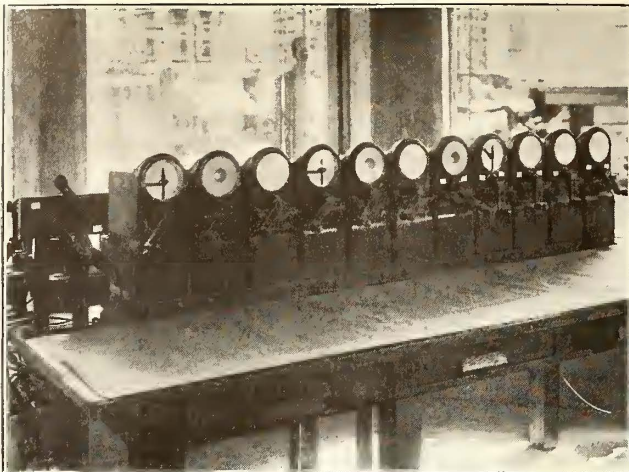
problems without the aid of previous experience by other street railway companies. The selection of the signaling system to be installed was based jointly on present steam railroad practice and the peculiar requirements of the problem at hand.

After careful study of the requirements, power interlocking was decided upon on account of its safety and rapidity of operation. Further study of the relative merits of electric interlocking and electro-pneumatic interlocking indicated that the latter system appeared to be best adapted for the work. On account of the necessity for operating on different levels and for rapid handling of cars at the Mulberry Street entrance to the upper level it was necessary to install three operating towers. Tower No. 1 was located on the lower level loop, tower No. 2 on the upper level loop and tower No. 3 at the entrance to the terminal yard.

From tower No. 1 are operated the signals and switches controlling the use of the two unloading tracks and the three loading tracks, Nos. 1, 2 and 3, on the lower level. The impossibility of viewing the entire territory controlled from this tower made it necessary to install therein a track model which indicates to the operator the passage of all incoming cars over the controlled sections of the unloading tracks, and makes possible the maximum use of these tracks without causing congestion. From tower No. 2 are operated the signals and switches which distribute the cars over loading tracks Nos. 4, 5 and 6 on the upper level. Ten lines of



P. S. TERMINAL SIGNALING—TERMINAL YARD, SHOWING UPPER TRAIN FLOOR ENTRANCES AND EXITS



P. S. TERMINAL SIGNALING—MACHINE LAYOUT, MULBERRY STREET TOWER

cars make use of these three tracks, and cars of the same line are sent over the same track, as passengers cannot pass from one platform to another except by returning to the concourse floor and re-ascending to the appropriate platform.

Tower No. 3 is located at the entrance to the terminal yard at Mulberry Street, and from this plant twelve lines of cars are handled. On the second day of operation the plant was called upon to take care of twenty-one lines of cars on account of a diversion of lines during a large parade incident to Newark's 250th anniversary celebration. This called for the handling of 250 cars per hour. The daily maximum number of cars handled per hour from tower No. 3 is 216. The total number of levers is thirteen, and they control five switches and eight signals.

The interlocking machines in all towers are similar and are of the unit type, facilitating the making of additions in the future. The upper cut on this page shows the interior of tower No. 3 and the machine lay-

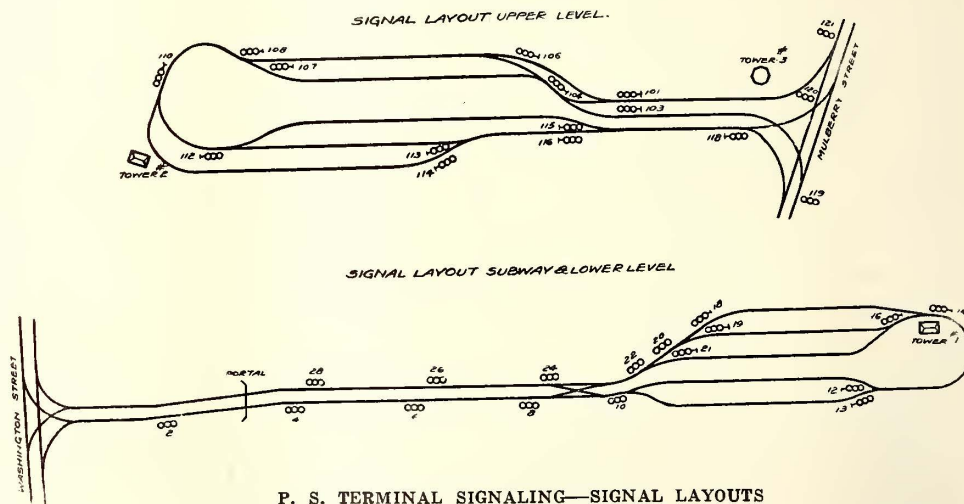
out. Another shows the general track and signal layout in the terminal yard.

All signals are of the light type, using 5-in. lenses, with all exposed signals hooded to intensify indications. With the exception of signals Nos. 119, 120 and 121 in Mulberry Street, and the space blocking signals in the subway, all signals employ two colors: red indicating "Stop," and yellow, "Proceed with caution."

Signals Nos. 119, 120 and 121 are suspended in a horizontal position from span wires in the street, red indicating "Stop," green indicating "Proceed—Right-hand route," and yellow indicating "Proceed—Left-hand route."

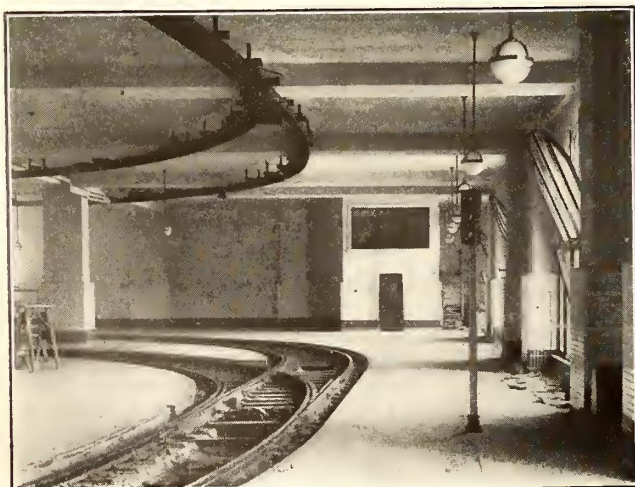
Solenoid control was selected for the switches leading from Mulberry Street to the terminal yard, as the installation of air cylinders in the street paving presented some difficulties. These switches are similar to the electric switches installed at many points on the Public Service lines.

At points of track convergence where trailing point switches are used automatic signals, controlled by track circuits, have been installed. These signals in common with interlocking signals have "Stop" as their normal indication and, upon a car entering the controlled section, the signal gives a "Proceed" indication, providing a car on the converging track has not already obtained a similar indication.



P. S. TERMINAL SIGNALING—SIGNAL LAYOUTS

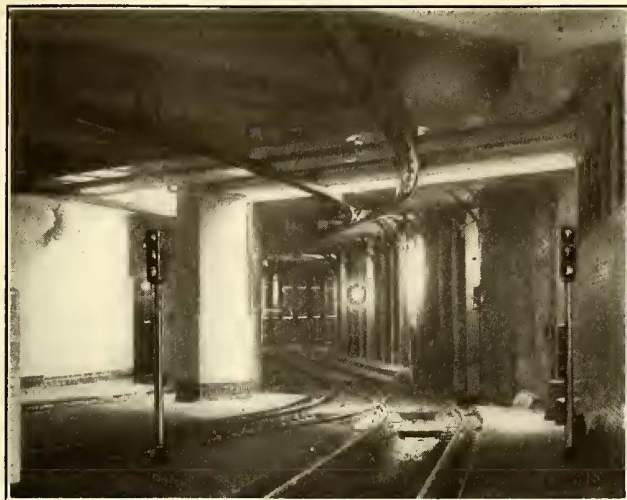
In the subway, three-position light signals, spaced 200 ft. apart, afford spacing protection. These signals are controlled by track circuits and are overlapped, giving indications as follows: Red, "Stop—Block occupied";



P. S. TERMINAL SIGNALING—TOWER NO. 2, UPPER LEVEL



P. S. TERMINAL SIGNALING—MULBERRY STREET TOWER



P. S. TERMINAL SIGNALING—SUBWAY TRACK LEADING FROM LOWER LEVEL



P. S. TERMINAL SIGNALING—PARK PLACE FRONT OF TERMINAL ON OPENING DAY

yellow, "Proceed with caution—Prepare to stop before passing next signal"; green, "Proceed."

A double cross-over installed in the subway at the entrance to the lower level provides a means for operation in case of obstruction of one of the tracks. The switches are equipped with switch-circuit controllers which operate in conjunction with the signal system to give "Stop" indications when the switches are open.

Electric current for the operation of signals is supplied by a motor-generator set using 600 volts on the d.c. side. This generates alternating current at 220 volts which, by means of the three-wire system, is transmitted to the signals at the proper voltage. Emergency connections with the a.c. mains supplying the terminal are also maintained. Compressed air for switch operation is obtained from the compressors which furnish air for other purposes in the building.

**SIGNAL INSTRUCTIONS TO TRAINMEN**

The following is an extract from the general instructions issued to trainmen concerning the operation of the signal system:

**GENERAL NOTICE**

The rules and instructions herein set forth apply to the use of signals installed to safeguard and govern movements of cars and trains into and out of Public Service terminal. These rules supersede all previous rules and instructions inconsistent therewith. In addition to these rules, special orders may be issued from time to time. Such orders, when

issued by proper authority, whether in conflict with these rules or not, must be obeyed while in force. It shall be the duty of all trainmen to familiarize themselves with the following definitions and rules, as well as the location of the different signals, the meaning of the different indications and the extent of the protection afforded.

**DEFINITIONS**

*Fixed Signal.*—A signal of fixed location indicating a condition affecting the movement of a car or train.

*Interlocking or Interlocking Plant.*—A system of switch, lock and signal appliances so connected as to prevent conflicting signal indications and to insure the proper position of the track layout to be passed over, thus protecting movements in the interlocking territory.

*Interlocking Station or Tower.*—A place from which an interlocking plant is operated.

*Light Signal.*—A fixed signal in which the indications are given by the color of a light.

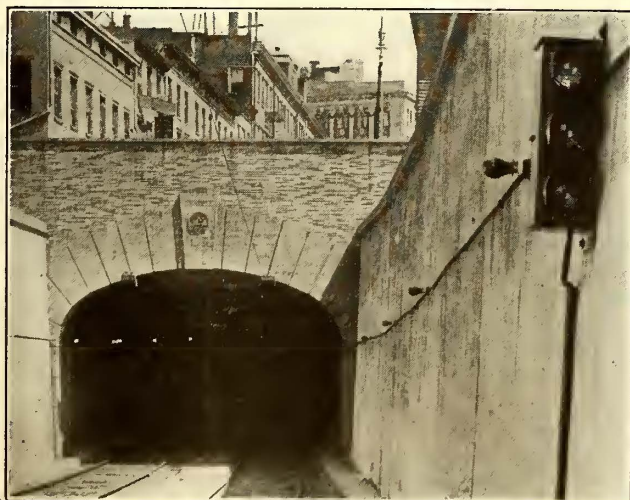
**GENERAL RULES**

1. Signals are provided to give authority for car movements and to protect such movements, but the use of signals does not relieve the motorman in any way from the responsibility of operating his car with caution with regard to obstructions on the track, clearance of other cars and position of switches.

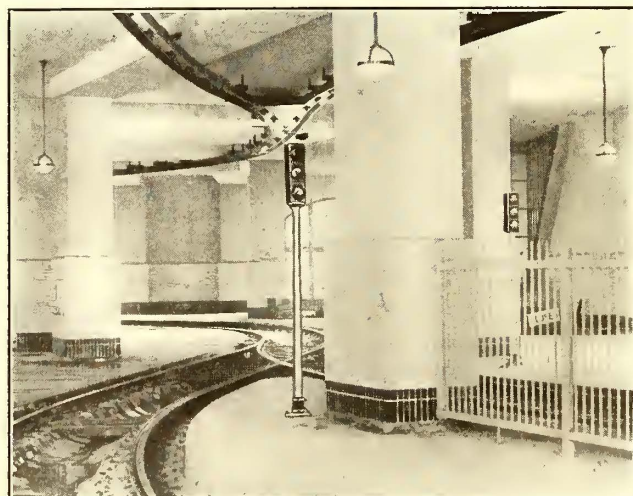
2. The movement of cars and trains will be governed by signals at the right-hand side of the track.

3. The signal indications are: Red light, "Stop"; yellow light, "Proceed with caution"; green light, "Proceed at normal speed."

Note: In the horizontal signals on Mulberry Street a green light is used to indicate "Proceed—right-hand route,"



P. S. TERMINAL SIGNALING—THREE-POSITION SIGNAL AT SUBWAY PORTAL



P. S. TERMINAL SIGNALING—AUTOMATIC SIGNALS AT CONVERGING TRACKS

and a yellow light to indicate "Proceed—left-hand route." All movements over switches in street are to be made with caution.

4. The motormen must observe the indication of fixed signals until passing them.

5. When a signal indicates "Stop" (red) the motorman must stop his car far enough back from the signal so that the indication can be clearly seen. A signal indicating "Stop" must not be passed except as provided in the rules.

6. A signal giving an improper indication (two colors at once or a white light) or a dark signal (except signals Nos. 119, 120 and 121, on Mulberry Street—see below) must be regarded as a stop signal, and the fact must be reported to a signalman, starter or inspector.

7. When a car or train is stopped by a signal that is evidently out of order, the motorman will proceed with caution upon receiving a hand signal from a signalman, starter or other authorized person.

8. All signals are distinguished by numbers which must be used in reporting signals.

9. Reverse movements past signals must not be made except under direction of starter, signalman or other authorized person. Cars must not under any circumstances be backed through operated switches unless the switches are properly set. Serious damage may result from a violation of this rule.

*Signals at Facing Point Switches in Terminal.*—Signals Nos. 10, 14 and 16 are on the lower level. Signals Nos. 101, 104, 110, 112 and 118 are on the upper level.

10. These signals and the facing point switches adjacent to them are operated from the interlocking towers.

11. Each of these signals will give the "Stop" (red) indication after the passage of each car or train until the route is set up for the next one, when the "Proceed with caution" (yellow) indication will be given.

12. The protection afforded by these signals extends only as far as the insulated rail joints just beyond the switches. Cars must clear these joints to permit another movement of the switch.

13. Signals Nos. 103 and 106 are operated from tower No. 3 in conjunction with the facing switches of the cross-overs, and will give the "Stop" (red) indication when these switches are set for movements from one track to the other.

*Signals Governing Movements over Trailing Switches.*—Signals Nos. 12, 13, 18, 19, 20 and 21 are on the lower level. Signals Nos. 107, 108, 113, 114, 115 and 116 are on the upper level.

14. These signals are entirely automatic and are operated by the cars moving over the track sections.

15. A broad stripe painted across the track (or a sign reading "Signal control limit") about a car length from the signal, indicates the point where the control of the signal begins. Cars must not pass beyond this point until ready to proceed after receiving or discharging passengers.

16. These signals will normally give the "Stop" (red) indication. As a car passes over the signal control limit, the signal will change to the "Proceed with caution" (yellow) indication if it is safe to proceed. (Signals Nos. 20 and 21 will give a green indication if signal No. 22 is green or yellow.) (See signals in subway.)

17. If two cars on adjacent tracks move toward the signals at the same time, one signal will change to the "Proceed" indication while the other signal will continue to indicate "Stop" (red) until the first car has passed beyond the switch point. This latter signal will then clear and the second car may proceed.

18. The rear-end protection afforded by these signals extends only as far as the switch, except in case of signals Nos. 18, 19, 20 and 21, where the protection is continued by the signals in the subway.

*Spacing Signals in the Subway.*—Signals Nos. 2, 4, 6, 8, 10, 18, 19, 20, 21, 22, 24, 26 and 28.

19. These signals are entirely automatic, and are operated by the cars moving over the track sections.

20. The signal immediately behind a car or train will give the "Stop" (red) indication.

21. The second signal behind a car or train will give the "Proceed with caution" (yellow) indication. In passing such a signal, the motorman must reduce speed and be prepared to stop before passing the next signal.

22. If the track is clear for two sections ahead the signal will show a green light indicating "Proceed at normal speed."

23. These signals afford continuous protection in-bound from signals Nos. 2 to 10 and out-bound from signal Nos. 18, 19 or 21 to a point near the east end of the waiting platform near Washington Street.

*Cross-overs in Subway.*

24. The two cross-overs in the subway are operated by

levers located between the tracks just east of the cross-overs, the two switches of each cross-over being operated together by one lever.

25. When the cross-over is used, the switch lever must not be thrown back to its normal position until the car or train has passed out onto the main track. Under no circumstances must a car be run through the switches unless they are properly set.

26. Dwarf switch lights are placed opposite each of these switches. They show a green light in both directions when the switch is set for the main track, and a red light in both directions when the switch is set for the cross-over.

27. Signals Nos. 8 and 22 will show a red light when any of the switches are set for the cross-over.

*Switches at Washington Street Entrance.*

28. The facing point switches at Washington Street are operated by standard electric switch mechanism with trolley contactors.

29. In operating the switch on the private right-of-way in front of the waiting room, use power to turn south on Washington Street and coast under the contactor if turning north on Washington Street.

30. The switch on the south-bound track on Washington Street is operated according to standard practice. Use power if turning the curve into the subway, coast under the contactor if continuing south on Washington Street.

*Signals and Switches at Mulberry Street Entrance.*—Signals 119, 120 and 121.

31. The facing point switches on Mulberry Street are ordinarily operated from tower No. 3, and movements over them are governed by signals Nos. 119, 120 and 121.

32. These signals are suspended horizontally over the street and give the following indications: Red light (in center), "Stop"; green light (right end), "Proceed—Right-hand route"; yellow light (left end), "Proceed—Left-hand route."

33. Motormen must approach these signals with their cars under full control, and before proceeding must see that both the switch and the signal are set for their proper route.

34. While the signals are designed to give right-of-way and to protect against conflicting car movements, it must be borne constantly in mind that vehicular and pedestrian traffic is not regulated by the signals, and the usual care must be exercised to avoid accident. Neither does the use of signals relieve the motorman of the necessity of exercising due care to avoid collision with other cars in case signals should be improperly given or accepted.

The entire signal and interlocking equipment described above was furnished and installed by the Union Switch & Signal Company. The solenoid-controlled electric switches in Mulberry Street were furnished by the United States Electric Signal Company. The plans and specifications for the Public Service terminal signaling were drawn by the company's engineers under the supervision of the signal department. The Union Switch & Signal Company's engineers ably assisted in the working out of the many problems involved.

## War Effect on Accident Increase in England

The extent to which decreased lighting and other war-time conditions have added to street traffic dangers is indicated in the recent report of accidents issued by the British Home Office. During the twelve months ending Dec. 31, 1915, there were 3014 persons killed and 60,189 injured by vehicles on public highways in the United Kingdom. These figures, the highest yet recorded, give an average of more than eight deaths and nearly 165 cases of injuries per day. Mechanically propelled vehicles were almost entirely responsible for last year's increase, causing 614 more deaths and 4597 more cases of injury than in 1914. Of the deaths in the whole of the London area, including the city, 156 were caused by motor omnibuses, 439 by other motor vehicles, eighty-seven by tramcars, 172 by horse-drawn vehicles (other than tramcars or omnibuses), and thirteen by pedal cycles; 10,158 persons were injured by motor cars, motor vans, etc., 4020 by electric tramcars, 2786 by motor omnibuses, 5482 by horse-drawn vehicles, and 4423 by bicycles.



# Iowa Association Meets

Utility Franchises and Regulation Discussed at the General Meeting—At the Technical Session on Wednesday the Topics Considered Were Rail Joints, Training of Trainmen and One-Man Cars

UTILITY franchises and regulation were the principal topics discussed at the joint session of the Iowa Gas, Electric Light, Street & Interurban Railway Association held at Dubuque, Iowa, on May 10. E. M. Walker, president Iowa section National Electric Light Association, presided, and Hon. J. S. Saul, Mayor of Dubuque, made the address of welcome. H. C. Blackwell, Davenport, responded fittingly, and among other things emphasized the importance of harmony and cooperation between the public utilities and the communities they served. If harmony is lacking, he said, it was because some one was unfaithful to his trust.

George McLean, president Key City Gas Company, Dubuque, then delivered an address entitled "Theory of Public Utility Franchises." An abstract of this address appears on another page of this issue.

Austin Burt, Waterloo, opened the discussion with the statement that a franchise was the same as any other private contract except that it contained an element of public trust. Unfortunately, in its execution the public was too frequently represented by men who only strived to further selfish interests. He was of the opinion that the twenty-five year limit was inspired by the thought that it eliminated the disadvantages of the perpetual franchise. Mr. Burt was opposed to the profit-sharing plan between the municipality and the company, mentioned by Mr. McLean, but did favor an indeterminate franchise. Other points brought out in this discussion were that the public, as a whole, is not so familiar with business affairs and with contracts as are the utility operators. Owing to this fact, the public would be apt to look with suspicion on any contract or profit-sharing plan, no matter how favorable to the city, and it would be very difficult to explain any such plan in detail to the public.

R. A. Leussler, Omaha & Council Bluffs Street Railway, was also opposed to a profit-sharing plan which did not share the profits with the utilities' patrons rather than with the public. W. H. Abbott, vice-president Red Oak Electric Company, urged that the public should be impressed with the importance of the rates of interest paid for new capital. He said that the public looked upon a utility as a necessity rather than a luxury, just as it considered roads, streets and other public improvements. Municipalities can borrow money for these at 4 or 5 per cent, yet they are no more vital to the public's needs than the service of the utilities. If the public could be brought to understand that it could make it possible for utility companies to borrow money at the same rate, a solution would be afforded. It would permit reductions in rates and improvements in service. Ample capital at low rates of interest would permit a higher standard of construction and thus reduce the rate of depreciation. Another point made was that any burden imposed upon the service of a public utility represented simply a surtax to the consumer.

## ELECTRIC RAILWAY SESSION

Following this general meeting a session was held of the Iowa Street & Interurban Railway Association, at which the two subjects discussed were the schooling of trainmen and rail joints. Both aroused a lively discus-

sion. R. A. Leussler presided and opened the session with a few remarks concerning developments in the electric railway industry during the year. He said that at the last meeting the jitney situation was alarming, but that it had practically solved itself and very few jitney buses were now operating in the State. This year the high prices of materials and the demands for increased wages were the subjects of greatest importance confronting the railways. In closing, he said that the executive committee of the association now had before it the question of admitting manufacturers' representatives to full membership in the association.

R. H. Findley, superintendent of track and roadway Omaha & Council Bluffs Street Railway, then read his paper on rail joints, published in abstract elsewhere, and F. V. Skelly, assistant superintendent Tri-City Railway, Davenport, opened the discussion. He told of the experience of his company with electrically welded rail joints and the number and character of failures. J. M. Bramlette, vice-president and general manager Lincoln (Neb.) Traction Company, said that his company had installed 967 Lorain welded joints in 1914, and there had been only eleven failures with these joints. In most of these failures, the web of the rail had cracked.

H. Mann, Goldschmidt Thermit Company, explained the difference between his company's old type and the new insert type of welded joint. He was of the opinion that the rail should be welded at the head to make a successful joint. He said that out of 700 welded joints placed in Chicago in 1915, only one failure had occurred. Mr. Mann said that thirty-two thermit joints had been installed in 9 hr. in San Antonio, Tex. Concerning the increase in price from \$6.50 to \$7.50 he said that this was due to the 300 per cent increase in the price of aluminum.

O. S. Lamb, superintendent Waterloo, Cedar Falls & Northern Railway, then read a paper on the selection and training of trainmen. This paper is published in abstract elsewhere in this issue.

C. E. Fahrney, general manager Ottumwa Railway & Light Company, agreed that frequently the men who were difficult to train made the best trainmen. He said it was the practice of his company to re-employ trainmen who had left the service while in good standing. Mr. Leussler said his company had adopted the same policy, but had limited the number of times a man would be re-employed.

Mr. Lamb stated in response to an inquiry that he examined his interurban trainmen on the standard code, but the men in the city service received a written examination on a set of questions relating to their particular duties. He was of the opinion that the men could not be too good for the service. If they showed special talent they were appointed to better positions. President Leussler said that he had found it particularly advantageous to keep the written examinations of trainmen on file. When one claimed never to have heard of a certain rule, these examination papers often proved that the employee had forgotten. He also said that in some instances the men who looked too high-class for the service did not stay. In reply to an inquiry from W. H. Evans, Tool Steel Gear & Pinion Company, it was

stated that generally the sons of trainmen were unsatisfactory. When they were intelligent their fathers had higher ambitions for their sons' futures.

J. P. Ingle, general superintendent Keokuk Electric Company, did not believe in the generally adopted method of schooling trainmen after the preliminary instruction. His company continued the instruction at monthly meetings. At these the trainmen are informed of their records in detail and the effect on the operation of the company. The men in town questioned the superintendent concerning orders and instruction, and frequently made good suggestions. In this way every trainman knew the results which were being obtained by the company and took an active interest in improving the results. When men are employed for motormen or conductors, they are told that any position in the company's organization is open to them. Motormen and conductors have been transferred to other departments, and the plan has proved advantageous, particularly in emergencies. If extra crews are needed they are available.

Mr. Bramlette, Lincoln Traction Company, said that his company had employed men between the ages of nineteen and forty-five, but that he had changed the age limits to twenty-five and thirty-five. He said that he had recently tested a plan for rewarding men for reducing accidents, but he believed that it tended to make them dishonest in reporting accidents. Mr. Bramlette also said that last Christmas his company gave each employee a savings bank book with a small amount of money credited to his account. A recent inquiry at the bank showed that more than \$15,000 had been credited to the accounts of employees.

Mr. Lamb, Waterloo, explained that his company used the Brown system of merits and demerits, and that sixty-five demerits discharged a man. He said that this system had been a great incentive to trainmen to make good records. Regarding one-man cars, Mr. Lamb said that they had been so successful in Waterloo that the public did not want to change to two-men operation, and although the men objected to them at first they were no longer opposed to them.

Charles Munsen, manager at Marshalltown of Iowa Railway & Light Company, said that one-man cars had been in operation on that property for more than two years. When service was inaugurated, he told the business men of Marshalltown that it was impossible to give them the service they should have except by changing to one-man cars. He also convinced the City Council and the Mayor of this fact, and consequently there was no complaint from them. When the one-man cars were substituted for the two-men cars, all trainmen were retained and given shorter hours and an increase of 5 per cent per hour in pay. At the present time the trainmen object to two-men operation, even at fair time when the traffic is heavy. He also said that as a result of one-man operation accidents had decreased, better men were obtainable and the public now considers one-man cars both safe and satisfactory.

Just before the session adjourned, Mr. Skelly called the attention of the association to the work of the American Railway Association, which is endeavoring to standardize the color scheme and aspects of highway crossing signs and signals. He recommended that a resolution be sent to the proper committee of the American Electric Railway Association, recommending that it co-operate with the American Railway Association committee because this subject was of importance to interurban railways. The association approved his suggestion.

The meeting scheduled on May 11 was to be a general

meeting with the Iowa Gas Association and the Iowa section of the National Electric Light Association. Another technical railway session was scheduled for May 12. At this John Sutherland, master mechanic Tri-City Railway, was to present a paper on "Inspection and Maintenance of Rolling Stock" and an illustrated lecture on steel poles was to be given by A. H. Bates of the Bates Expanded Steel Truss Company. An abstract of Mr. Sutherland's paper is published in this issue.

## Rail Joints

BY R. H. FINDLEY

Superintendent of Track and Roadway Omaha & Council Bluffs Street Railway

The problem of splicing rails in such a way that practically a continuous rail will result has been attempted for many years with varying degrees of success. The perfect joint for uniform service is yet to be found. If it is being used it has not yet demonstrated its mechanical efficiency to the satisfaction of street railway engineers in general, and the result is that numerous types of joints are constantly being developed.

In providing proper splices for rails we are bucking up against a construction problem quite different from almost any other connected with the electric railway industry. That enormous temperature strains take place is certain. In our city we have had welded rails break in a number of places which no doubt required a strain of from 15,000 lb. to 40,000 lb. per square inch, making the total tensile strain somewhere between 108,000 lb. and 290,000 lb. It might be very true, however, that a portion of this was due to shrinkage strains concentrated at the rail weld. However, it has been said that for each 7-deg. change in temperature a strain of 1000 lb. per square inch results in the rail, this unit strain depending, of course, on the type of track construction. Bolts have snapped off from shrinkage strains in open track during winter months, and in remote cases smaller rails on open track have broken because of contraction in extreme weather, this occurring where no welds were applied.

Experiments have been made to determine the approximate differences in temperature between the base of a high rail in a paved street and the ball of the rail. Some have shown that the rail, when the air temperature is climbing from normal up to 90 deg. Fahr., will develop a difference of 12 deg. between the base and the ball, the rail finally assuming an even degree of heat, hotter than the air by several degrees. This variation in temperature results in longitudinal shearing stresses in the rail which must be transmitted through the joints or decimated in the roadbed.

During the hot weather enormous compressive forces resulting from temperature rises are at work in the rail. Rails being confined are thereby prevented from jumping all over the street, resulting in compressive stresses in the steel, which no doubt in time affect a change in the molecular condition of the rail.

Failure of bolted joints to resist forces in the past has been due generally to imperfect mechanical fit between rail and plates, improper bolting, the use of inferior bolts, poor workmanship, and failure to realize the necessity for grinding or smoothing up the surfaces of the rail after applying joint plates. Few have failed from not being able to resist bending moments, if foundation is properly constructed.

Foremost among refined methods of splicing rails for modern service to-day, stands the necessity for grinding off the surfaces of the rails after applying the joint.

Rails cannot be rolled with precise cross-section, and

slight differences in the surfaces of the rails at joints usually exist when laid new.

If these differences at the joint are allowed to remain a constant hammering is going on. The load not supported on springs, as nearly as can be determined, is delivering blows which in some cases vary directly as the square of the velocity of the car, and inversely as the diameter of the wheel. A portion of this variable force is taken up and the energy wasted through the resiliency of the rail and wheels. In addition to this blow we have the impact at a joint delivered by the load supported on springs, which for ordinary differences in rail heights remains approximately constant.

If plates and rails are not resilient enough to provide for these differences in height, and if joint construction cannot take care of all the dissipated energy the remainder will be transmitted to the tie and substructure of the track and wasted there. If the wooden ties are laid on a rigid base, the tie will become badly damaged. If the tie is a steel one laid on concrete, the concrete will eventually disintegrate.

Differences in height of rails at joints must be removed immediately to conserve the life of the joint. Practice has demonstrated this very forcibly within the last eight years, and I will mention one particular instance out of many where the issue was brought to my attention. Two pairs of compromise splices were installed of the Atlas type where 70-lb. A. S. C. E. rails were connected to 97-lb. 424 grooved section. At the time of installation in 1913 a very slight difference in the surface of the rails was noticed, and we neglected to grind the rails to a smooth surface. This was a single track over which 26-ton cars operated on from a headway of from three to four minutes. Inside of eight months these joints were a wreck, including paving and rail ends. In order to repair them, new Atlas plates were installed, new pieces of rails were cut in, and the joints were then ground to a true surface. After more than two years these joints are apparently as perfect as on the day they were installed. We find this to be particularly true on compromise joints at special work.

If we use bolted joints we must draw the rail ends together as tightly as possible, when applying plates. If this is not done a depression will soon result. It has even been demonstrated under heavy traffic that a rail will eventually cup out at the point where a saw cut is made through the ball of the rail.

In general, mechanically applied joints fail as a result of impactive forces, rather than from bending moments. If bolted joints are to be adhered to, the maintenance-of-way engineer will, perhaps, not look with favor on the use of rolling stock equipped with wheels of small diameter, as there is a slight tendency at the present time to do, unless he can be assured that there is a corresponding decrease in the "no spring" load. He also would appreciate car equipment design involving the very lightest of truck construction obtained by the use of alloy steel, if this is practicable.

#### VARIOUS TYPES OF JOINT

We are all familiar with the plain bolted fish-plate joint. In years past this served the purpose admirably, due to the lighter equipment and comparatively infrequent service. On our system we have a number of miles of track constructed of 73-16 steel, Lorain section No. 291, on which bolted fish-plates were installed from ten to sixteen years ago. The joints were pulled very tight when the track was laid, but were not ground. Over this track, at the time it was constructed, single-truck cars weighing from 10 tons to 12 tons were op-

erated with infrequent headway, probably from twelve to fifteen minutes. Some of this track had this light service for several years, during which time, due partially to the use of salt in heavy winter snowstorms, there was a great amount of oxidation between bolts, plates and rails. We have some of this track upon which 90 per cent of the joints are perfect to-day, upon which 20-ton cars are operating under headways varying from four to seven minutes.

We have reconstructed some track of this type because of repaving operations, and after cutting off the bolts a large amount of sledging was necessary to remove the plates. Such experiences show that under some local conditions practically a continuous rail can be developed at little expense, without resorting to more expensive types of joints and welds if car service is light enough.

On bolted joints which have failed we find the underside of the ball of the rail cut, and the plates cut, to such an extent that a new pair of plates will not fish to the rail. If the plates are renewed there will still be movement of the rail and pounding. In making repairs on such types of joints we have resorted to the use of shims made of soft sheet iron bent in such a manner that they cannot work out. These are fitted between rail and plates. By then grinding the surfaces of the rails to remove the cups, considerable life may be added to the track, pending street improvements.

The ordinary fish-plates for Section L. S. 97-lb.-424, can be bought and installed on our system for \$2.80 per joint without bond with ordinary wrought-iron bolts. However, for present-day city service with frequent headway this installation is not adequate, although improvements are constantly being made to the old fish-plate type of joints. In some cases the holes through the plates are reamed to the size of hole in the rail, after the rail ends are drawn tight; then high-tension bolts are inserted with a drive fit. For a 7-in. rail from six to ten bolts of 1½-in. diameter are used. In some places hot rivets have been used instead of the bolts.

For all mechanical splices, too much stress cannot be put upon the use of alloy steel, or heat-treated steel bolts, giving us a higher elastic limit and greater ultimate strength. The ordinary wrought-iron bolts have an elastic limit of about 30,000 lb. per square inch and an ultimate strength of approximately 50,000 lb. With the chrome steel bolt or heat-treated carbon steel, strengths of double this amount are possible. The greater elastic limit will allow for slight movements of the plates in adjusting themselves to the rail when first applied and are not so liable to be stretched beyond their elastic limit with a 36-in. wrench. A longer wrench should not be used on 1-in. bolts. These improved bolts cost approximately twice as much as do those of wrought iron.

Together with the use of higher tension bolts the lateral strength of the plates must be sufficient to develop the strength of the bolts without buckling. Plates which will bend under a bolt will develop a "line" contact instead of a "plane surface" contact at "fishing" surfaces which should be prevented.

The Clark joint, which is extensively used in Cleveland of late years, involves the use of standard, heavy, twelve-hole fish-plates, with reamed holes through plates and rail, and drive fit bolts. A chunk of thermit at the base is used for conductivity, also adding strength to the base of the rails at the joint. It is said this joint costs approximately \$6 on 7-in. rail.

In Baltimore a riveted, ten-hole fish-plate joint with the thermit, similar to the Clark joint, has been used

with holes reamed before driving rivets, costing them, I understand, about \$6.70 each on 7-in. rail.

A form of fish-plate joint has been developed and patented, providing for preheating the plates, and using drive fits bolts. By reaming the holes when plates are hot and bolting up the joint, the shrinkage of the plates will draw the rail ends very tightly together.

As opposed to the fish-plate there are other types of splices which attempt to obtain three planes of contact. Foremost of these types, all developed from the angle bar, we find the Continuous, Atlas, Webber, Wolhaupter and One Hundred Per Cent joints.

The Continuous joint has been used very extensively all over the country in both steam and electric railways. It costs us, installed exclusive of bond, approximately \$5.25 per joint including grinding on 7-in., 97-16 grooved rail. The use of high-tension bolts brings the cost without bond to \$5.55 and with brazed bonds at present prices \$6.25.

The Atlas joint, which is of similar type with provision for two truss bolts in the bottom, below base of rail, is of the malleable cast type. It is claimed that three planes of contact result by the use of the truss bolts, at the base of the joint. This bolted splice appears very good with high-tension bolts in the base. The consensus of opinion among track men seems to favor a rolled joint as against a cast type for general use, as so much depends upon the workmanship in making up patterns and finishing malleable castings.

In order to provide three perfect planes of contact, a composite joint has been developed by Mr. Nichols, formerly connected with the Philadelphia Rapid Transit Company. This embodies the use of zinc spelter between the rail and the joint plates and in spaces left under the head, tram and base of the rail. At the present prices of spelter this joint is very expensive.

Coming now to the different attempts to develop a welded splice and to provide a continuous rail, it may be said that all engineers have attempted to do away with as many splices as possible and to reach, as nearly as it is practicable, a rail of continuous length. In using 62-ft. rail we have almost reached the limit of handling, although we could handle 10-ft. longer lengths, and a number of the types of joint already mentioned furnish, in so far as some traffic is concerned, a splice which provides a practically continuous rail throughout the life of the steel.

There are a number of different methods of welding rail joints. Perhaps the electric welding process, by the use of heavy current and low voltage through which steel plates are welded to the web of the rail, is the most widely known. This process, it is understood, is controlled by the Lorain Steel Company and is installed through contract with them or their lessees. A large amount of special equipment is necessary to make the installation. Plates are welded at spots to the rail. A weld through plates is made at the rail ends, and one on each end of the plates. It is claimed that the method has been perfected in late years, until the percentage of breakage the first year after installation has been cut in Chicago from 5 per cent in 1907 to 0.25 per cent in 1910.

The cast-weld process by which molten iron is poured into a mold inclosing the rail ends has been used extensively in many cities. About 100 lb. of metal is used to splice a 7-in. rail, the iron flowing through the holes in the rail ends thereby binding itself together. The effect is quite similar to the iron-bound construction used in the manufacture of manganese-steel, hard-center special frogs and switches. This type of splice has been abandoned by many companies, although it is still used

by a number—notably in St. Paul and Minneapolis. Much depends upon the care used in performing the work and the final finishing of the rails. Water jackets have been used in attempting to prevent the heating of the ball of the rail, thereby preventing to some extent the softening of the rail ends.

The Goldschmidt Thermit Company joint requires considerable grinding and we estimate it to cost on our system \$8.50 per joint complete in addition to an investment in the necessary apparatus. We used 500 of this type in 1909-1910 on old steel rails. These joints were of the old type of weld and they gave us a considerable percentage of breakage the first year. The new type, however, is a great improvement over the old design.

There are types of joints of recent development through which plates are arc welded to the web or base of the rail. One of these, called the Apex joint, supporting the ball of the rail, is put out by the Indianapolis Switch & Frog Company. It consists of plates with angled ends, arc welded to the web and base of the rail. We have installed some of these joints on repair work only, the cost on new 7-in. steel approximating \$5 per joint.

In Columbus, Ohio, a joint involving the use of association standard eight-hole fish-plates, with the arc welds, has been used. It is claimed that this joint can be put on for \$4.50 in Columbus. This figure, however, would be low for our city on account of the higher cost of materials and would be about \$6.50 per joint.

Arc-welded fish-plates are particularly serviceable for making repairs. We have some track, laid before we made a practice of using expansion joints during the construction period, in which a number of joints opened slightly. We found it impracticable under the conditions to go back over the track and draw the rail ends together, and we were also pressed by the city to hurry the work along. These conditions, coupled with the fact that we had no facilities for grinding the joints after the track was completed, caused an early pounding at the joints, damaging both plates and rail ends to such an extent that new plates did not fit. Recently we have been removing the old joints, installing Apex joints, and welding with the arc welder, building up the ball of the rail with the same welder and grinding to a smooth surface. Very good results have been obtained. This track has had service of twenty-seven double-truck cars per hour in each direction during the lean hours of the day, and about twice this number during the rush hours, cars weighing from 18 tons to 20 tons empty. The cost of replacing with the Apex joint is approximately \$6.50 each, including tearing up and replacing the paving and 50 cents for current consumption.

We are trying another method of making joint repairs to some of our old track where Continuous joints have become badly damaged by the joints cupping. We remove the plates, and using the outside plate, we have the base cut off in a planer in such a way that, on inverting the plate, there will be a space outside of the head of the rail upon which a ribbon of steel can be laid with the arc welder. Another ribbon is laid at the base. Holes are repunched so that bolts can be installed and tightened, using a home made plate on the inside of the rail, quite similar to the inside bar of the Apex joint. A little difficulty is experienced with the arc welder in laying ribbons of steel on this work, due to the rather uneven surfaces of the rusted rails. We have decided that on this work it saves time to grind the old rust completely off before welding, using a small electric portable grinder having a flexible shaft.

Now as to the selection of a type of joint to satisfy

the needs of any particular electric railway system. This is to a great extent a local problem. The life of the rail is not always the life of the joint. We have removed rails upon which the base had entirely rusted away, while at the same time the joints were very good—plates being rusted on perfectly and it being necessary to rebuild the track on account of the repaving of the street. It would have been folly to have welded such joints originally. On the other hand, we have had sections of track upon which much maintenance has been necessary at the joints. Pounding has broken the rail ends, necessitating the cutting in of pieces; however, it has never been necessary to rebuild any one section of our track due to poor joints alone. With maintenance on our older and heavier traveled track we have been able to nurse it along pending repaving of the street. In only one instance have we found the cost of repairing excessive, and that was on an exceptionally heavily traveled section of track.

On sections of modern city track lightly traveled, with no immediate prospect of an increase in service, with service no more frequent than seven minutes, and equipment weighing from 18 tons to 20 tons, the use of a good type of bolted joint, such as the Continuous type, carefully applied with high-tension bolts, surface ground will, perhaps, give proper satisfaction throughout the life of the track.

On other sections of heavily-traveled track, with headway less than seven minutes, it is the opinion of the writer that the application of a bolted joint is not the best of construction. A properly applied pair of heavy fish-plates involving the use of welded lines of steel should give satisfaction. In such a case, driven fit bolts of high strength should be used to help resist temperature strains. On the more heavily-traveled sections of track, perhaps the use of an entirely welded joint would be economy.

On any section of rail which has been in service fifteen to twenty years we can expect some maintenance whether joints are welded or bolted. We have nothing to prove to us locally that welded joints on such lines will not, after a number of years, show up large numbers of breaks due to crystallization or granulation of the steel and to temperature and shrinkage strains at welds. Whether this maintenance will be greater than joint maintenance is a matter for local anticipation. However, the adoption of a type of joint depends somewhat upon the track construction. If steel ties are used, embedded in solid concrete construction, providing a non-resilient roadbed, it would seem advisable to abandon altogether the purely bolted type of joint and to adopt either a combination welded and bolted joint, or else to weld the rails.

At the present time we are making a trial of an improved fish-plate joint on some of our heavier-traveled track which we will rebuild this year. This joint combines the use of six 1¼-in. drive-fit ordinary wrought-iron bolts with the arc-welding process. The fish-plates are of an exceptionally heavy six-hole section with no space for concealed bond. After drawing the rail ends hightight we will ream the holes to 1¼-in. and drive through 1¼-in. machine bolts. On account of the condition of the steel market we will use the 1¼-in. wrought-iron bolts at present. However, our plan is to use 1½-in. heat-treated steel bolts later on. After the plates are thoroughly tightened we will arc weld and lay a ribbon of steel along the base of the plates connecting them to the base of the rail. In addition to this a 6½-in. x 12-in. x ½-in. plate will be welded below the joint by two lines of weld. This joint will cost us slightly more than the Continuous joint we are now using.

## Theory of Public Utility Franchises

BY GEORGE MCLEAN

President Key City Gas Company, Dubuque, Iowa

Mutuality should govern the conditions of all public service franchises for the reason that whosoever operates a public utility under authority of a charter acts in the place of the municipality which has elected not to perform the service directly. If this fact were duly and constantly regarded by both parties to the negotiations, there would be no franchise question. If the return of the public service company were limited by law or contract to a fixed and guaranteed rate on the investment, any excess going into the public treasury, all could understand that the exactions imposed upon it should be such only as would be considered wise and just if the property were operated by the city directly, and that the burden of all further exactions and restrictions must ultimately fall upon the patrons of the service in the form of higher charges for the same than would otherwise be necessary. When these burdens are such as to arouse the apprehensions of investors in the securities of the company, the effect is equivalent to an advance in the cost of raw materials. For among the materials the public service company must use in its business, capital is chief. The terms upon which the company can secure this capital depend upon its credit, which may be impaired by legislation, or even by the threat of legislation, of no compensating value, nor of any value whatever, to its patrons.

It is not feasible for the municipality to guarantee the public service company a fixed return on its investment, as, even if there were no legal obstacles in the way, this would destroy the company's motive for the exercise of those virtues upon which private ownership of any class of property depends for its justification. Nor does mutuality require that the contract guarantee a fixed return. What it demands on the one hand is that the public authorities prescribe for the government of the company only such regulations, burdens and restrictions as an enlightened government would impose if the utility were administered by the municipality directly. The contract lacks mutuality, and hence justice, unless the public authority, for each burden or restriction it imposes, recognizes a balancing obligation of its own. Thus the law limiting franchises to twenty-five years is unsocial, inequitable and lacking in mutuality because it does not provide for amortization of the investment within the company's corporate life. Mutuality requires correspondence between the franchise and amortization periods. This restriction upon the life of franchises originated in the experimental years of regulation and under conditions which no longer exist. The minor regulations contained in franchises, or often proposed in the city council or the legislature, should also in any fair consideration of this topic be submitted to the test of mutuality. The model franchise, like the ideal constitution, contains few specifications and seeks to preserve the rights of the people through powers reserved rather than through legislation detailed.

The ordinary franchise prescribes a maximum rate which the company is free to reduce on its own motion and without awaiting the action of the public authorities. This liberty has been freely exercised. In many instances rates have been reduced voluntarily, not upon warrant of increased volume of business, but merely upon expectation that this result would follow. However, mutuality must be automatic in operation if it is to be reliable and permanent and is to command the confidence of the public. Speaking for myself, I favor profit sharing as a guarantee of mutuality and a means of assuring the company's patrons of their interest in

its fair treatment, its economical, efficient and just management and its prosperity.

This profit-sharing plan contemplates a standard rate and a standard dividend, which dividend is not to be guaranteed by the city but is to be retained by the company if it succeeds in earning it. This standard dividend should be cumulative, should correspond to the rate the banks of the community charge on loans carrying hazards equal to those borne by the public service company and should be based on the value of the property devoted by the company to the public service. Further net earnings, if any, should go to a reserve fund until the latter reaches a certain proportion of the capitalization based on the inventory value of the company's property.

The reserve should be used when necessary to maintain the property, or meet a deficit in the standard dividend, and should be available for no other purpose. Any surplus which might be accumulated after meeting the requirements of the reserve or emergency fund should be divided between the company and its patrons on a sliding scale. Any dividend above the standard allowed the company out of this surplus should be proportioned to and dependent upon its rebates to consumers. Thus a particular concession in the rate should give the right to a particular increase in the dividend, and a further concession in the rate should authorize a further increase in the dividend.

Under this plan rates would be automatically adjusted to the worth of the service to the consumer. His rebate, or dividend, would rise or fall with the prosperity of the company, and the company's right of participation in the earnings above the standard dividend would be its sufficient motive for endeavoring to operate the property with the utmost economy and to increase the profitable business from year to year. Its success in these particulars would measure not only the consumer's return but its own.

Excepting the class which condemns all rent, interest and profit in any industry as unjust, may we not safely assume the willingness of the public to concede a reasonable profit to the useful and legitimate industry which may be able to attain it, and its further willingness to concede to the management a fair degree of participation in the benefits of progress in the industry? Profit sharing is proposed in the belief that such assumption is safe and that it would dispel those misunderstandings and suspicions which often in the past, and frequently to their mutual disadvantage, have disturbed relations between the public service companies and the people.

## Selection and Training of Trainmen

BY O. S. LAMB

Superintendent Waterloo, Cedar Falls & Northern Railway

We all have our pet methods of selecting men for the various duties devolving upon them. But either consciously or unconsciously, I believe, most of us, in choosing an employee, have in mind an ideal candidate and in that way select the applicant whose qualifications, mentally, morally and physically, most nearly approach this ideal.

By the very nature of the case, it is impossible to adopt a scientific formula and apply it to the selection of men for the many places that have to be filled. A hard-and-fast rule might be workable if we were permitted to make our selections from raw material of a high grade. Obviously, this is impossible and every man who is charged with the selection of trainmen must be content to make his selection from average and often from inferior material. Fortunate, indeed, is he who

can see in the awkward, embarrassed candidate the making of an efficient employee. There is no more important function of the hiring officer than this power of discernment, unless it be the ability to develop the raw recruit into the capable trainman.

There is a great deal of literature on efficiency in all lines of industry and in all departments of transportation. Scientists tell us that psychology should be employed by the man whose duty it is to select employees in a given occupation and develop them along the lines of efficiency. This is the theoretical side of the matter and, of course, it cannot be wholly ignored. Yet I believe that most of the hiring officers, as a general thing, are committed to the idea that the only way to develop competent trainmen is in the school of experience. We will all agree that the school of hard knocks either puts the polish on a trainman and makes a competent, reliable man out of him, or else puts him in the discard.

On the Waterloo, Cedar Falls & Northern Railway our system of handling an applicant for a position as trainman after he passes the customary examination is to put him to work in the shops to familiarize him with the different classes of equipment. Here he receives instructions on the control stand, is taught how properly to work up power and to manipulate the hand brakes. During the time he is serving in the shops or on the cars as a student his references are being investigated, and if these are satisfactory he is then permitted to take a car, if the seasoned trainman who has been breaking him in recommends such a course. An applicant's references are of great value and no employee is permitted to remain in the service unless his previous record has been good.

We promote our men from city service to interurban service, and we do not hire direct to the interurban service unless we have no one in the city service who is capable of passing the examination. We operate about 100 miles of electric railway, doing passenger and freight business, and the class of service requires as keen and bright trainmen as any railroad operating with steam. We require all motormen, conductors and brakemen to pass an examination on the standard code of train rules for single-track operation, and we are just as technical and thorough in this examination as the steam lines. We follow up this examination with a series of surprise tests, our trainmaster being required to pull off four such tests a month on the interurban lines. A careful record is made of these tests, and if a trainman fails to follow out the rules he is disciplined.

We hold semi-monthly meetings for our trainmen and the discussions are in charge of an officer. The legal department is represented occasionally, giving the men talks from the standpoint of the law and its application to the operation of cars and trains, and the relative rights of the cars and trains to the other traffic upon the streets and highways. The claim department gives them talks on personal injuries and how to avoid accidents and the master mechanic speaks to the men on shop practice, construction of cars and the handling of equipment. The electrical engineer gives a lecture now and then on the electrical appliances and construction of motors, and the trainmaster takes up with them every-day questions of operation, while the writer endeavors to prepare something for every meeting that will be interesting and instructive. The men join in these discussions, ask questions and tell their experiences. It has a good effect, and our older men, to whom is given the breaking in of the students, receive a great deal of benefit from the practical lessons of these meetings.

On account of the extremely varied class of our equip-

ment, motormen, when passing from the city service to the interurban service, spend a great deal of time in our shops. We have several different types of control, but our latest and heaviest equipment is provided with HL control, and as our heavy freight equipment differs considerably from passenger equipment and the men are required to pass an examination, they remain in the shops from two weeks to thirty days. The knowledge a motorman gains from actual experience with the equipment and its troubles is worth more to him than the advice obtained from an instructor and is worth a great deal more to him than any instruction he can obtain in any other way.

Such an elaborate course of instruction is really necessary. Unless we provide the means for imparting adequate instructions to our trainmen, we are not doing them full justice—and our work does not even end there. Every man should be given a fair chance to demonstrate his ability and he should be treated with leniency, until he has had time to become familiar with the duties assigned him. When we have done our part in the matter, by giving our men a fair opportunity to render competent service, there will be less occasion for taking snap judgment upon the men who have made a mistake or who have overstepped the line of duty because of insufficient instruction. So thorough should this preliminary training be that the statement "I didn't know that was against the rules" ought never to be heard. I need not say to you that fair dealing and patience in the treatment of men who are derelict is good policy. We should never discharge a man hastily, for a full and fair investigation of the case may reveal mitigating circumstances. It is a poor rule that has no exceptions. Where you find a good bunch of men, contented, well versed in their duty, courteous to passengers, prompt and attentive to business, and men who have the interest of the road at heart and work with a will with no grumbling and no discontent, you are bound to find competent, well-trained officers.

## Inspection and Maintenance

BY JOHN SUTHERLAND

Master Mechanic Tri-City Railway, Davenport, Iowa

It is a universally accepted principle that accidents to work people are to be prevented, not so much by legislation as by voluntary effort through the co-operation of employees and employer in the interest of safety. The motto for all street railway men should be "Safety First," and for all maintenance and inspection men "Is It Safe?" Safety is a business question because it is a losing proposition to have a skilled workman incapacitated. It costs money to compensate him or his relatives, and it takes time and money to train another man in his place.

"Is it safe?" This is a question which every inspector should put to himself where any risk might be involved, and, having cultivated the habit, he is likely to minimize the number of accidents and pull-ins that arise from taking a chance with badly-worn parts of equipment.

The subject of inspection and maintenance has received its full share of publicity. The electrical journals have a special department for the voicing of opinions of all maintenance men. These articles are very instructive and helpful, and it appears to me that there is very little left unsaid on the subject, but anyone familiar with this work as well as with the training of men has learned that it requires more than systematic inspection to get the best results.

The hub of inspection and maintenance is the repair shop. In this department you must have skilled me-

chanics in their various lines. If the railway managers would listen attentively when we want high-grade men for this class of work they would soon get results, as these men, being conscientious, would not allow any parts of equipment that are defective to leave their department.

There is nothing that makes an inspector lose interest in his work more quickly than an armature which throws solder from a badly-soldered commutator immediately after installation. Right here I take issue with some articles that have been written regarding the method of testing armatures before placing them in service. The high-voltage test gives you information on nothing but insulation, and a motor on a 600-volt circuit does not require any test in excess of the line voltage. When an armature is wound, it should be tested for insulation with the line voltage, and for short-circuits and faulty soldering by the low-voltage transformer yoke test, each segment of the commutator being short-circuited to discover faulty soldering. As a further precaution, the motor, after being mounted in the truck and ready for service, should be made to move the car with the three other motors (on a four-motor equipment) disconnected. This test is more severe than it can possibly get in service and gives assurance that it is perfect in every way.

We have kept a careful record of motor failures and armature removals, and find seven-tenths to be due to mechanical trouble, principally bearings becoming low, and these are discovered by the inspector, with his gages, on regular inspection trips every fifteen days, or 2000 miles. It is a significant fact that we only rewound one armature for being low in 25,187,200 motor-miles; this record covers sixty-eight quadruple equipments of the modern type. Seven of the equipments mentioned have run, up to March 1, 3,794,200 motor-miles, without having an armature removed or a bearing installed, and they show very little wear.

Credit for this showing must be given to the modern methods adopted by motor manufacturers in the design of the bearings, which have the waste packed against the shaft on the low-pressure side, a column of waste over it (the oil being fed from below) and with an oil pocket for gaging the depth of oil. The waste used is elastic and lively, and the oil is especially adapted for this class of work. One armature winder takes care of 951 motors, which average 4000 miles per month.

Our bearing practice is a very novel one, as we plane all axle and motor caps so that one diameter is slightly scant. After this is done the bearings are set in the cap, the halves of which are drawn tightly together with a large wrench. The bearings are thus clamped securely in position, and a uniform grip is assured over the entire surface. This manner of fastening eliminates all surface wear, and the dowel pins are only used as a guide for the proper position of the bearing. All our bearings for each type of motor are interchangeable. If an armature shaft is worn we turn it down, shrink on a steel sleeve and turn it down to gage. When we turn down the shafts we leave a good fillet, but never turn a square shoulder, and we have never experienced any broken shafts at this point. When finished, these sleeves are about 7/64 in. thick, and none of them has ever loosened up in service. They are put on at a dull red heat and allowed to cool slowly.

One tool used in modern practice is indispensable—the acetylene welder. We have put this tool to many varied uses, a few of the most important being as follows: When a small crack in an axle is discovered it is cut out "V" shape and welded up, then turned off smooth in a lathe, and the results obtained have been very satisfactory. We weld our keys in the axles and

find this plan to be a big money saver. We also build up our broken motor cases, worn journal boxes, truck frames, etc., but have never attempted its use in repairing broken wheel flanges, as I don't think that in the interest of safety it is the proper thing to do.

Inspection is for the purpose of preventing any delays to service by making repairs in time instead of repairing after trouble has occurred. This is extremely important in order to maintain a perfect schedule for the transportation department. A good inspection system, well established and properly conducted, is bound to bring results. The work is different from repair-shop work, it being an art in itself. This class of work should only be allotted to men who can be relied on to know whether a partly-worn piece of equipment will be safe until the next inspection. It is unreasonable to expect the best results unless due consideration is given, not only to the selection of the men but also to the surroundings and facilities connected with their work. Good work cannot be expected under disagreeable working conditions.

The inspection of equipment in this enlightened age is comparatively simple, on account of the steel car and the interpole motor. The inspectors find it an easy task to give the different parts a thorough inspection, as flash-overs are a thing of the past, and with this trouble eliminated one disagreeable task has been done away with.

Two years ago, on one of our interurban lines, we had a great deal of armature trouble which could not be accounted for. The armature insulation would be roasted, and then the motor would ground. We kept a careful watch for this trouble and found it occurred only on certain motors. The fields were tested and found in good condition, and we came to the conclusion it was the different diameters of wheels that caused the trouble. The wheels were taken out and turned until they were of uniform size, and no further trouble of this kind has since been experienced. Since the wheels were made uniform our maintenance records show a very marked decrease in armature troubles. That there can be a relation between uniform wheels and motor maintenance is disputed theoretically by eminent professors, but their knowledge is not infinite, and results obtained in practice are what count with us.

There are many features that enter into low maintenance costs, one of which is a well-run storeroom. It is not a paying proposition to keep a car costing \$5,700 out of service any length of time waiting for material to repair it. All companies should have a first-class man in their storeroom, one who must be held responsible for all repair parts, and who must also keep his stock up to the minute. His one problem to contend with is the cost of investment for the supply of repair parts, and with this in view he never overstocks on anything, although it is always more economical to have the repair parts in the storeroom than hold the cars out of service. Another feature is to keep records of the different parts of the equipments. By this method one can soon detect any faulty inspection and catch it in time, and the blame can be put where it belongs. You cannot be too careful with records, as this is the only means you have in devising a way for more economical maintenance. There never was a time like the present for practising economy, as material has doubled in price. Wages have increased by leaps and bounds, and the jitties are cutting into the receipts, but the value of the nickel received has not increased proportionately, and we are giving better service every day.

There is nothing more discouraging to a master mechanic than to have the manager say: "Look at these figures; their road is about the size of ours, but their

maintenance is 15 per cent lower. Investigate this and find the reason why they can make such a showing." Maintenance comparisons look well on paper, but no two cities have the same conditions to contend with. The city with the low maintenance cost has the following advantages: The line voltage is good, the feeders are adequate for the service, the track is in first-class condition and well bonded, the equipment is of the most modern type, the cars are light and properly selected for the service, while the city with the high maintenance has the track in poor shape, low voltage, heavy equipment with obsolete motors not designed for the service. From these diverse conditions you cannot get similar results.

With the development of the light-weight, modern motors it pays to scrap obsolete equipment, not only from a maintenance point of view, but also from the saving in weight and power consumption. Where the cost of motors per 1000 miles is 90 cents per motor, and the cost of light-weight, modern motors is 20 cents per 1000 miles, you can readily see it is a good investment to get rid of your older types. With modern motors your cars can give 25 per cent more mileage, as such frequent inspection is not required, and there is considerably less liability of breakdowns. The points just mentioned do not include the loss of time and revenue from failure of cars, which necessitates their being taken out of service for repairs. This is a big item when you have but a few spare cars to keep your schedule up to the mark.

Maintenance and inspection work varies in every city, and no hard or fast set of rules would apply to all properties, as the different kinds of equipment have their own specific peculiarities and a schedule of inspection made to suit their requirements.

## Psychology of Signal Observance

At a recent meeting of the newly-organized Economic Psychology Association at Columbia University, New York City, a paper on the causes of railroad wrecks was presented by O. V. Fry. In this it was stated that information had been collected on seventy-two wrecks which were caused by failures of engine men to recognize signal indications. Contrary to common belief, the greatest number of such man-failures appeared to take place during the middle of the day when the natural light was at its best. In forty-two cases out of the total of seventy-two wrecks investigated the weather was clear, the fact that fewer accidents occurred during fog being attributed to the extra attention to signals which was given under bad weather conditions. Twenty-nine of the wrecks were due to misinterpretation of fixed color signals and the remainder to failures of recognition or observance of the position of semaphores. The author considered that during the daytime color signals had been proved to be more easily read than semaphores. This was explained because the eye and the mind caught the appearance of a color more quickly than the position of an arm. The author urged the use of psychotechnical tests in connection with the employment of trainmen, and stated that these gave a method of comparison even better than the indication of ability displayed by an employee's accident record.

The Northampton (England) Corporation Tramways have recently constructed a home-made tower wagon by mounting a tower apparatus on the chassis of a 16-24 hp. Fiat automobile which was chanced upon in the yard of a certain London dealer. During the six months the machine has been operated it has traveled many hundreds of miles without any trouble.



## Tests on 30,000-Kw. Turbine

The Most Recent Units for the Interborough Rapid Transit Company, Reaching a Thermal Efficiency of 25 Per Cent, Have Made the Gas Engine Obsolete in Large Stations

At a meeting of the American Society of Mechanical Engineers in New York on May 9 a paper was presented by H. G. Stott and W. S. Finlay, Jr., in which were given the results of a series of elaborate efficiency tests on one of the 30,000-kw. cross-compound steam turbines recently installed in the Seventy-fourth Street power station of the Interborough Rapid Transit Company of New York. Before the paper was read Mr. Stott made some preliminary remarks on the development of prime movers since the year 1900, when the Seventy-fourth Street station was installed.

At that time the plant was equipped with reciprocating engines of 5000-kw. rating and a maximum capacity of 50 per cent overload. The water rate was 17½ lb. per kilowatt-hour, and the cost of the engine, generator and condenser approximated \$40 per kilowatt of rated capacity. The plant was of the unit-type arrangement, and 4000 hp. of boilers were furnished for each 5000-kw. turbine. When the new turbines were installed, each one occupied the same floor space as one of the original reciprocating engines, although the turbines was of six times greater capacity. The new machine had a water rate of 11½ lb. and cost about \$9 per kilowatt, including generator and condenser, being operated by the same eight boilers that had originally supplied steam for the 5000-kw. reciprocating unit.

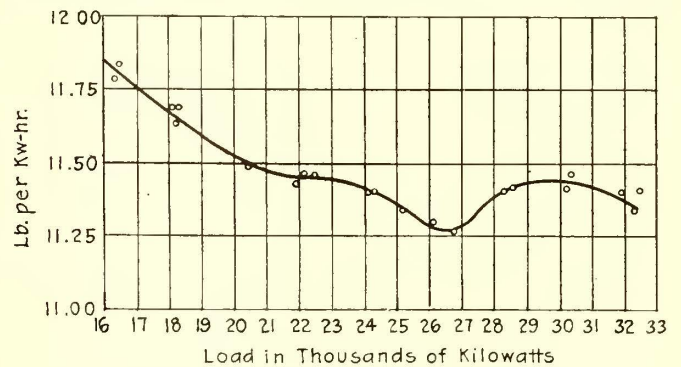
This extraordinary development of the turbine, Mr. Stott said, had caused it absolutely to have displaced the gas engine for power station work. The thermal efficiency of the turbine now approximated 25 per cent, as good a figure as could be obtained from the gas engine, while the latter involved very much higher overhead charges and maintenance costs. For the same reason, hydroelectric power, which looked like a gold mine fifteen years ago, even when the cost of development ranged between \$200 and \$300 per kilowatt, was to-day not a good investment. Even at Niagara Falls, where the development charge is at a minimum, and where the supply of water is practically unlimited, hydroelectric power cannot compete with that obtained from a modern steam-turbine station when the load factor is less than 50 per cent.

The paper of the evening was then presented by Mr. Finlay. This gave a brief description of the installation and presented in detail the results of the tests. From the figures, it appeared that the maximum efficiency was attained with a load approximating 90-per cent capacity, the water rate at this point being 11.25 lb. per kilowatt-hour. Throughout all of the tests, the operating conditions were approximately the same, the figures for the test giving the lowest water rate being as follows: Absolute steam pressure at throttle, 224 lb.; steam temperature at throttle, 500 deg. Fahr.; superheat, 108.5 deg. Fahr.; absolute steam pressure at primary inlet, 215 lb.; absolute steam pressure at low-temperature inlet, 15 lb. Vacuum referred to 30-in. barometer, 28.86; average load, 26,740 kw.; water per hour, 301,035 lb. The water rate for this test was 11.258 lb. per kilowatt-hour, this figure being corrected to meet standard conditions involving 215 lb. absolute primary-inlet pressure, 120 deg. superheat and 29. in. of vacuum. The Rankine-cycle efficiency under these same conditions was 75.84 per cent and the thermal efficiency was 24.81 per cent.

The load under which the turbine was tested took the swings as normally produced by the railway substations

which were being supplied with power, but a number of tests were also made under throttle control to show the influence of the swings upon the economy. The latter results, however, did not differ from the former, showing that swings even amounting to more than 30 per cent of the average load made no appreciable difference in the performance.

In the discussion which followed F. Hodgkinson, of the Westinghouse Electric & Manufacturing Company, who had designed the turbine, discussed the irregularity that appears in the water rate curve above loads of 22,000 kw., this having been found definitely to be due to some other cause than errors in the readings. He ascribed it in part to the action of the separator that



INTERBOROUGH TURBINE TESTS—WATER-RATE CURVE

was installed between the high-pressure and low-pressure elements for the purpose of removing the water that otherwise would be carried over into the low-pressure blading. This separator was of the centrifugal type, and it was found at times to be inefficient, the removal of the collector plates actually reducing the amount of water carried over at certain loads. R. J. S. Piggott also commented upon this phenomenon, stating that it is impossible to remove the last few per cent of moisture in steam with baffles. It is best to slow down the velocity of the steam below 3000 ft. per minute, at which point the "fog" coalesces into drops which will separate themselves from the flow of steam.

In answer to a number of questions that were raised during the course of the discussion, Mr. Stott stated that the maximum capacity of the turbine was between 33,000 kw. and 34,000 kw., it being rated at 30,000 kw. and guaranteed for a load of 32,000 kw. Beyond this point, the turbine lost speed, so that an addition of 25 per cent overload would produce a slowing down of about 15 per cent from normal speed. The monthly average coal consumption of the plant approximated 1.5 lb. per kw.-hr. With the original reciprocating engine displaced by the turbines, the coal consumption had been 2.5 lb. The thermal efficiency of the station as a whole averaged 17 per cent throughout the month at the present time.

Employees of the Bridgeport division of the Connecticut Company have a family gathering known as the Order of the Black Bow. On Monday evening, April 24, the order gave its annual banquet, entertainment and dance in the Masonic Temple, Bridgeport. There were 175 in attendance, including employees, their families and a few guests from other divisions of the company. The first part of the program was an amusing and clever rendering of the playlet "The Yankee Peddler." A banquet was served and was followed by dancing. The Order of the Black Bow has been organized about two years, and two or three of these get-together meetings are held each year.

# P. S. R. A. Discusses Railway Problems

Chief Topic Was Enforcement of Commission Orders for Regulation of Jitneys—Papers on Labor, the Engineering Manual, and Physical Examination for Employees Are Published This Week

THE spring meeting of the Pennsylvania Street Railway Association was held at the Hotel Brunswick, Lancaster, Pa., on May 9 and 10. The first session, on the afternoon of May 9, was devoted to addresses on the labor situation, the general needs of electric railways and physical examination for employees, while the concluding session on the morning of May 10 was largely taken up with the presentation and discussion of miscellaneous topics concerning the operation of electric railways.

## FIRST SESSION

The first meeting was called to order at 2 p. m. by President Thomas A. Wright, vice-president and general manager Wilkes-Barre (Pa.) Railway, who in his president's address criticised the theory of labor leaders that an employee by reason of his employment acquires a vested interest in his employer's property. An abstract of Mr. Wright's address is published elsewhere in this issue. After the reading of the treasurer's report President Wright introduced Charles L. Henry, president American Electric Railway Association, as the first speaker on the program.

## REMARKS BY PRESIDENT HENRY

In his opening remarks President Henry complimented President Wright upon the sentiments expressed by him and went on to say that the relation of labor and capital is perhaps the most serious problem confronting the American people to-day. The subject has been of increasing importance in the last few years, but the special conditions now surrounding the nation make the problem worse than before. Provided the employer does what is right, he would, in President Henry's opinion, have no trouble in getting along with his labor if the agitators did not interfere. These are abroad in the land, fomenting trouble and preying on the public mind, which is led to suppose that labor receives good from their actions.

President Henry then discussed the relative scope of activity of the American Electric Railway Association and the state bodies, and said that owing to the local problems arising in various sections of the country nothing at all would be gained by making the state associations a more intimate part of the national body, which deals only with questions so nearly universal in scope that all companies can work together therein to aid one another. There is no conflict between the two classes of associations, for they are both working for the good of the same industry although on different questions.

Turning from this point, President Henry observed that there is a present tendency on the part of many people toward government and municipal ownership, but he averred that enterprises under such a plan could not be conducted as economically, as efficiently or as much for the benefit of the community as would be the case if they were privately owned. The present high state of development in this country has not been brought about through government ownership but through individual initiative, and even though with expansion there has come a greater use of the more im-

personal corporate form of ownership, this in its final essence means simply ownership and management by the same American brain and bravery that have made this country what it is. No governmentally owned institution has reached the perfection in business organization attained by such companies as the Pennsylvania Railroad, the Bell Telephone Company and many others, and any adoption of government ownership propaganda would mean a suspension of progress and a general crippling of the country.

In regard to government and state control, however, President Henry felt that such a plan was right, necessary and not at all experimental. He traced the development of the regulation idea and showed how under the present plan the power of the government and the states is exercised in delegated form by the commissions instead of being applied directly through legislative channels as formerly. The only trouble with the idea is that in many states the commissioners are selected with almost a total disregard of their fitness for the work to be done. If commissions are made up of men qualified by education and experience to serve, regulation will work out all right, but with inefficient men on the boards only inefficient regulation can result. President Henry cited, as an example of wise regulatory practice, the act of the British government whereby in taking over the railroads for war purposes it chose for the commission in charge not politicians, but the general managers of the lines.

In closing his remarks President Henry reviewed briefly the increased burdens in labor costs, paving improvements and taxes, and said that the time has come when the condition in the electric railway field must be thoroughly explained to the public. The public, he stated, has had reason to complain of some things, but the present railways should not inherit the punishment that should have gone with the blame. At present there is a deplorable public sentiment against railways that does not exist in the case of enterprises owned by individuals, and there is a great need for railways to force the public to see the necessity for a fair deal. President Henry believed that much progress toward removing public ill-feeling could be made through the more extensive use of common courtesy, and he urged that all employees, from the lowest to the highest, be more imbued with the idea that the railways are asking the public for patronage and that the public must be so treated that its patronage will be gladly given and its good-will maintained.

## OTHER PROCEEDINGS

At the conclusion of President Henry's address President Wright urged the Pennsylvania Association to show more frank, vigorous and concerted effort in the discussion of the operating problems concerned in public relations, and he emphasized the fact that more unified effort should be made to disseminate information regarding the needs of electric railways.

Owing to the inability of the men to be present, the scheduled papers by J. A. Keppelman, on "Current Street Railway Problems," and by D. I. McCahill, on "Court Trials in Damage Suits," were omitted, and then Francis

D. Patterson, M.D., chief of the division of industrial hygiene and engineering, Department of Labor and Industry, Harrisburg, Pa., read a paper on "Physical Examination for Employees." This is abstracted elsewhere.

President Wright stated that his company had examinations made by a regular physician and an oculist and believed that records should be made periodically once a year. Out of 500 applicants recently examined only three were found defective. President Wright said that some antagonism was displayed by the old employees on account of fear that examinations would result in their being pushed aside, but he felt that the paramount duty in this regard was to take the necessary steps to insure the public safety.

A resolution presented at the last meeting in Scranton to the effect that the winter meeting of the association should be held on the third Tuesday and Wednesday in November and the spring meeting on the third Tuesday and Wednesday in May was then taken up and passed, and the meeting adjourned. Through the courtesy of the Conestoga Traction Company the delegates then made a very interesting sightseeing trip through the residential and business sections of Lancaster. In the evening an informal dinner to association members and guests was given at the Hotel Brunswick.

#### FINAL SESSION

Owing to the recent death of W. B. Rockwell, manager Eastern Pennsylvania Railways, Pottsville, Pa., the scheduled paper on "Jitneys—Their Effect on Street Railways" was not presented at the opening of the final session. President Wright stated that Secretary Stine was preparing a letter of condolence to be sent to the widow.

#### DISCUSSION ON JITNEYS

The first address was by E. H. Davis, manager Williamsport (Pa.) Passenger Railways, on "Legal Points in the Operation of Jitneys." Mr. Davis stated that the legal question in Pennsylvania had been cleared up by the recent decision in the Scranton cases making jitneys common carriers. Although the decision on its face covered cars with fixed termini and fixed fares, Mr. Davis thought that it was applicable to both regular and irregular jitney operators. In his mind, however, there was a real question of how to get protection under the decision. Counsel were gravely in doubt as to whether jitneys could be required to operate every day, for they were not like corporations with charters, and apparently the only way to proceed against them for non-operation would be by action of the Commonwealth against the drivers, for the lack of service would be a matter of purely public interest.

Mr. Davis then read part of a general ruling just issued by the Pennsylvania Public Service Commission to the effect that certificates of public convenience would be limited "to the route and number of cars and particularly to each automobile or auto-bus designated in the certificate," that certificates would be non-transferable and that automobiles or auto-buses authorized to be common carriers must have painted on each side three lines containing the name of the person to whom the certificate is issued, the word "auto-bus" and the number of the certificate. Mr. Davis thought that the Scranton decision would solve the problem in a majority of cases, and he did not think that certificates would be issued for summer operation only. He considered it hardly possible in many municipalities to get satisfactory ordinances, and on the basis of a broad view of the question it would be better to meet jitney competition through commission regulation.

W. A. Heindle, general superintendent Southern Pennsylvania Traction Company, Wilmington, Del., then described the experiences of his company in Delaware County. In this busy industrial center the jitneys started about a year ago with speedy service. There was no regulation, and at first thought it seemed that they cut into the returns of the railway \$75 per day. Mr. Heindle said that besides the small automobiles there were trucks, used industrially during the day, which carried passengers morning and night. One special delivery wagon for Gimbel Brothers was thus operated. Mr. Heindle doubted whether such trucks could be classified as common carriers. It was also found that there were a large number of pleasure riders in the jitneys, particularly at night. On May 1 the Council passed a jitney ordinance providing for \$50 license fee and \$2,500 bond, and this did a great deal toward cutting out jitney competition in Chester. The company doubled its service to take care of the extra traffic and the proposition is paying. Seven jitneys have taken out certificates but the competition is not serious.

W. E. Boileau, general manager Scranton (Pa.) Railway, said that all the jitney lines stopped running in winter, but that this spring one man began to operate an auto-bus line without a certificate and that later he with another man filed a petition for a certificate. This case is being argued now before the commission. Last year in Scranton there were at one time 105 jitneys, and fifty-two are in operation again this year without certificates. The company doubled the service on the lines concerned, but could not combat the jitneys on account of the foreign riders who wanted a 5-cent automobile ride. Mr. Boileau remarked that he had seen eleven passengers riding in one Ford car. As a result of a check made a few days ago it was found that on the Providence line the jitneys were earning about 10 cents per bus-mile and on the South Side 8 cents per bus-mile. The auto-bus line previously mentioned runs 100 miles on \$12, and it will probably cost the owner more than \$20 a day to operate. Mr. Boileau said that the Scranton Railway has filed or is filing complaints against the fifty-two jitney owners to compel them to seek certificates of convenience. Up to the present time the commission has not acted. The jitneys are cutting into the railway receipts about \$200 a day.

C. B. Fairchild, Jr., executive assistant Philadelphia (Pa.) Rapid Transit Company, felt that the Public Service Commission would have to discover through its own inspectors the violations of law, and certainly the burden should not be put on the street railways. To his mind there was a question whether the decision in the Scranton cases covered wild-cat jitneys, although there was no doubt about its reaching real bus lines. Mr. Fairchild told how difficult it was to secure enforcement of municipal regulation of jitney service in Philadelphia, and stated that the only way thus far devised was to secure an attachment on the car, and even here the \$300 exemption limit allowed the drivers to evade punishment by claiming they did not have \$300 or did not own the cars. Some cases, however, have been placed by the city solicitor in the hands of the sheriff and the cars are now bearing public auction notices. Mr. Fairchild suggested that the record of persistent violators might be cited to the State Highway Department with a petition for the revocation of the auto licenses concerned. This body, he understood, would not countenance continuous violations of city rules, and he would like to see several companies take up the question in this way.

George P. Wilson, chief bureau of rates and tariffs, Pennsylvania Public Service Commission, stated that he did not feel authorized to speak for the commission in

regard to jitney regulation, but he reminded the delegates that the subject of jitneys was one not considered when the regulatory law was passed and that time was needed to work out a program of regulation for such vehicles. In reply to a question, Mr. Boileau said that it cost 6.5 cents a mile to operate a Ford car, and President Wright stated that the cost in Wilkes-Barre was from 7.5 cents to 9 cents, the average being about 8 cents. President Wright also criticized the punitive part of the public service commission act for being weak as regards enforcement of fines and too long legal procedure. It was explained that a deliberate violation of an order of the commission subjects the party to criminal proceedings, and the commission will certify complaints to the attorney general to prosecute in the name of the Commonwealth. President Wright believed, however, that the proper procedure against jitney operators was through complaints to the commission, and that this would finally bring some fair action. The process might be hastened if the association were to request a hearing on the rules to be promulgated.

#### MISCELLANEOUS PAPERS

After the foregoing discussion a paper on "One-Man Car Operations," by W. E. Moore, president W. E. Moore & Company, Pittsburgh, Pa., was read in his absence by Mr. Fairchild. This paper will be abstracted in a later issue. Mr. Boileau said that one-man cars were a good device in many places and that in Houston they seemed to be working out very successfully. In Scranton, however, where there were fifty-six railroad crossings, the proposition was entirely different. Labor is opposed to one-man car operation, but the greatest difficulty is the flagging of crossings. President Wright said that in Wilkes-Barre there were eighty-five railroad crossings, but that his company had not taken up one-man car operation because such cars could not handle the peak loads, and multiplicity of equipment was not desired. If one-man cars were to be used, he would consider the placing of flagmen on the crossings. He mentioned the fact that sudden illness of the motorman was a very serious matter to be considered in connection with one-man cars.

J. E. Wayne, superintendent York (Pa.) Railways, then read a paper on "Street Railway Freight and Express Service and Mail Rates," to be abstracted later. The next paper was on "The Engineering Manual" by F. R. Phillips, superintendent of equipment Pittsburgh (Pa.) Railways. This paper is abstracted elsewhere.

In discussing the latter paper, M. Balluss, general manager Westchester, Kennett & Wilmington Electric Railway, Kennett Square, Pa., said that, although there was considerable talk about electric railway standards, he did not think all of the talk was put into practice. He mentioned the fact that some articles are used alike by both steam and electric railways, and in such cases he thought it would be advisable to consider steam railroad standards in use rather than to waste time and money trying to devise new standards. He thought that the greater purchasing power of the steam railroads was worth taking advantage of in such cases. Albert L. Allen, assistant manager State Workmen's Insurance Fund, Harrisburg, was then called upon for some general explanatory remarks in regard to workmen's compensation insurance in Pennsylvania, with particular reference to state-fund insurance.

The next paper was on "Rush-Hour Traffic" by P. T. Reilly, superintendent of transportation Scranton (Pa.) Railway, which was followed by a paper on "Handling Accident Reserves" by H. D. Anderson, assistant comptroller American Railways, Philadelphia, who took on the program the place of F. J. Pryor, Jr., assistant sec-

retary and comptroller of the same company. In replying to a question, Mr. Anderson said that the statistics for the various companies controlled by the American Railways varied, but in 1915 the lowest cost per accident was \$6.52 and the highest cost per accident was \$47.80, while the accidents to passengers per 1,000,000 passengers carried varied from 6.85 to 20.69. President Wright said that the average cost per suit was found by his company over a series of years to be about \$600, and Mr. Fairchild stated that the cost per claim for his company was calculated at \$390. The last paper on the program was by Mr. Heindle on "Training of Platform Men." The three papers mentioned in this paragraph will be published later.

Under new business it was moved that a committee of three be appointed to stand ready to co-operate with the Public Service Commission in matters affecting the association and the appointment of such a committee was authorized. Announcement was made that the Conestoga Traction Company had arranged for a trip to Engleside for the delegates who remained over, and the meeting was then adjourned.

#### President's Address

BY THOMAS A. WRIGHT

Vice-President and General Manager Wilkes-Barre (Pa.) Railway

One of the most serious industrial problems of the day is the theory being advanced by labor leaders and men under the socialistic influence that one individual working for another individual comes, at a certain time in the course of that employment, to have a vested interest in the property of his employer. In the last fifty years there has been a developing sentiment that the under man, or the man at the foot of the ladder, has been unduly oppressed and it is the responsibility of the men in charge to look to the welfare of the most insignificant employee, even where that employee is not inclined to look after his own welfare.

The criticism against capital and the employer formerly was that the old laws favored them against the workingman and labor in general. During the last twenty years, however, in response to the demands of labor, a great change has been made in the law, and now it is capital and the employer that complain against the law as favoring the laboring man. Has labor, however, shown any indication of being satisfied or even reasonable? Instead of being satisfied with the law, as it has been changed to its advantage, labor has become more and more dissatisfied, until now its dissatisfaction has practically taken the form of contempt for all law.

Just as disturbing as labor's dissatisfaction with its gains is the inclination of certain philanthropists to lose track of the fundamental law of the land. Seth Low, in a recent article on "Industrial Peace," assumes that because property is owned by thousands of stockholders, it is less their property than if it were owned by a single individual, and he goes on to argue that the workman who works for a corporation should receive greater consideration than a workman who works for an individual. Mr. Low voices these theories as a "growing conviction," without stating any basis of right for such a conviction. The class of laboring men who believe in this "theory" are laboring men who have no property or, if they have property, it has been acquired in dispensing this theory to those who would be anxious to hear it.

In the theory that a man acquires property rights in addition to his wages when he works for an enterprise, there is the elimination of all right of a man to his property. If that theory should be accepted, it would

mean that not only would a man lose the right as to the ultimate disposal of his property, but if one carries the thought to its logical conclusion the laboring man must lose the right as to the disposal of his labor. In other words, if a man acquires a property right in addition to his wages when he works for an enterprise, he is not able to sever himself from that enterprise at will, for the theory of property is responsibility as well as ownership. If, therefore, the enterprise should be a financial failure, he has no more right to abandon the enterprise because it is not paying him what he expected than he would have the right to disown any other taxable property when he found the taxes burdensome.

Mr. Low further states that the "feeling" of the men who believe in this theory and with whom it is a "growing conviction" is restricted to placing it in operation in a "railroad system or any other vast industrial plant." Such a statement shows how chaotic this theory of property is and how contrary to all human conceptions of reason and justice. Apparently this property right is acquired by the laboring man only when the plant is of a gigantic nature, or only when it is owned by a corporation and not by an individual. In other words, laboring men will be empowered to take part of the property of a corporation, but would acquire no property right in the plant that was owned by an individual. Following this theory to the *reductio ad absurdum*, the formation of a corporation will practically mean that the men putting in their capital and their money lose control of their property at the same time. If such a theory should ever come into operation, which, of course, it will not, every civilized country would be obliged to return to primitive and archaic methods of doing business.

An illustration will show the unsoundness and impossibility of such an economic theory and how it would work against the interest of industrial peace. A frugal and capable laboring man works twenty years and at the end of that time establishes himself in business with his savings. He employs some of his former fellow-workmen, who were less frugal and capable or, perhaps, less fortunate. After a few years in business these employees inform the new capitalist that they have acquired a property right in his business to the extent that he must pay them salaries that he does not consider justifiable and that he must continue to employ them and not hire cheaper help without their sanction. The acceptance of such a condition of affairs would mean that B, C and D, the non-frugal employees, had received during the twenty years they were fellow employees of A, their full wages, but, having spent and enjoyed the wages of those twenty years, they were now practically the beneficiaries of A because he had been more industrious, more capable and more frugal. In other words, all that A had accumulated by his industry and frugality was the burden of taking B, C and D in as partners.

The foundation of all civil law is the law of contract as it has come down from the Roman law. The march of progress has been not to destroy the power of contract, but to strengthen it and to broaden it. Hence, to strike at this law of contract, as the theory that a man has a vested right in his job does strike, is to strike at the fundamentals of civilization.

The law of the land, as it stands to-day, is clear. It is not permissible for a body of capitalists to enter into any combination that may be in restraint of trade. If a body of labor men, however, enter into a combination and decide that because of their demands they can paralyze the business of a community and terrorize the inhabitants, the community is supposed to offer no protest. The only excuse one hears for these conditions is

that the unions are in a position to ruin the political future of any public officer who goes counter to the sentiment of the union and its sympathizers. The union, therefore, becomes an extra-constitutional and extra-legal kind of government, setting at naught the law and the constitution and the rights of all citizens who oppose its will.

There may be those who say that this is an extreme statement, but I have seen it existing under my own eyes for the last fifteen months in Wilkes-Barre, where local laws, State laws and the criminal laws of the land have been absolutely defied. What does this mean to the nation at large if these feelings grow, and what bearing has it on those fundamental ideas of law and order and of internal peace and security on which this government rests? The right of men to organize, the right of men to organize for collective bargaining, the right of men to strike—these are admitted without question, but I cannot believe that any argument will ever be advanced that will justify men who claim the right to organize for the purpose of forcing another man to quit work against his wishes.

I believe in the dignity of labor. I believe in the future of labor, but no progress was ever made on this earth that was not made in accordance with law. I believe that, fundamentally, the laboring men of the country are a law-abiding body of men and that they wish for nothing more than the right to earn a decent living in a lawful and legal way, but the evils of the present day are bad leadership and loose thinking. With right-thinking men as leaders, there will come true industrial peace founded on law and order and justice.

## The Engineering Manual

BY F. R. PHILLIPS

Superintendent of Equipment Pittsburgh (Pa.) Railways

There are few, if any, words or phrases in the engineering vocabulary which have been subjected to so much abuse and are so little understood in general as the word "standard," which, we are told, is interpreted as being "a fixed or accepted rule or model."

We have been beset upon all sides and from every angle with standard this and standard that, until finally it has been said, and with no small degree of justification, that standardization is stagnation. When an art is in its formative state or when structures and apparatus are undergoing the process of development it is true that standardization has no place. Indeed, the solution of any problem requires that past theories and practices be cast aside, at least for a time, and that even the so-called fundamental laws should be subjected to the closest scrutiny, in order that true success may be obtained. However, in many cases, it is because of the very essentialism and need of a "fixed rule or model" that abuses have crept in, and many false and inferior methods and devices have been cloaked with respectability under the broad mantle of standard.

On the other hand, standard rules, standard methods, standard practices considered from the proper viewpoint have their usefulness and are of incalculable value. To those of us who have to do with the upkeep, performance and renewal of physical property, the certainty of this statement is without question. Without standardization, maximum efficiency is not possible, and without maximum efficiency, we have not secured the ultimate in economy.

We are all familiar with the reductions in manufacturing costs that are gained through quantity production, and we need dwell no further upon this phase of the subject other than to repeat the well-known fact that the greater the quantity, the lower the unit cost.

Nothing will produce that greater quantity except standardization.

The street railway industry is in its incipiency, and there is, perhaps, no other industry which has undergone so rapid development and experienced so many changes in construction details during its short life. It is expected that radical changes in construction and operating details will continue to be made. Nevertheless, there are many methods and parts of apparatus that are proper subjects for standardization, and it is these methods and practices which have emerged from the period of incubation and have been received and accepted as complete by the majority of those most intimately associated with their uses that have received the sanction of the American Electric Railway Engineering Association, and have been presented in a convenient form in its engineering manual.

In this compilation "standard articles, standard designs, standard specifications, standard units, standard terminology, standard measurements adopted shall be those which are applicable to general use and represent the best practice." These various items are graded into three groups, and it is not until a recommendation has received the final sanction of the association that the method or practice is given the prefix of "standard." However, to assist the members of the association and to direct their attention to growing practices, the manual carries a second grading known as a "recommendation." This covers articles, designs, specifications, units, etc., which represent the best existing practice but which, because of the formative state of the art, have not as yet reached the point where they may receive the full sanction of the association as finished products or "standards." The manual carries still another grading known as "miscellaneous methods and practices," which covers matters that are not proper subjects for standardization but represent general practice along their particular lines.

The general purpose of a standard as adopted by the association is to provide specific information particularly for the smaller-member companies of the association who have not the facilities and advantages which would be found in large corporations.

The amount of detail in connection with the working up of one of these standards is simply amazing. I believe I can say without fear of successful contradiction that not a standard found on the pages of the manual has not been subjected to investigation and close study for years before being brought down to its final shape. When we consider the time, and study, and expense, and experimentation applied to the finished product, we may feel safe in saying, and most emphatically, that the standards represent the last word and best practice in the present state of the art. One can have no hesitancy in commending them to your closest scrutiny, adoption and use.

In conclusion, let me repeat that standardization has its place and has a definite function to perform. This necessity is thoroughly understood and appreciated by the members of the American Electric Railway Engineering Association, who also realize to the fullest extent the necessity for uniform care in the compilation of these standards for their use. You may be assured that, when any proposition has passed the censorship of the various committees, and finally the committee on standards, and still later, the scrutiny of the members of the association at large, you will be safe in its use. Finally, bear in mind the fact that production costs may be materially reduced through uniform requirements and quantity production, and that standardization is the greatest contributing factor toward this advantage.

## Physical Examination for Employees

BY FRANCIS D. PATERSON, M.D.

Chief Division of Industrial Hygiene and Engineering, Department of Labor and Industry, Harrisburg, Pa.

Inefficiency due to poor health is a burden distributed upon many shoulders. The corporation which has physically substandard employees suffers from decreased quantity and often quality of work performed. The commonwealth bears its share, for often the man or woman becomes the recipient of medical care in a hospital which is at least partially supported by state funds. Finally, the illness may be such as to cause the unfortunate to lose time, and his loss of wages falls as a heavy blow upon those dependent upon his or her earnings for support.

It is unfortunate that reliable statistics upon the subject of loss of time, as a result of illness, are not available in America, but it has been calculated, from German statistics, that every wage earner in this country loses at least eight or nine days a year by reason of illness. If we stop to consider the millions of workers in America, the sum of the total loss in wages alone amounts to more than \$360,000,000 each year, and this takes no account of the losses in profits to the employer by reason of a slowing up of his output, or of the loss to the state at large owing to a premature old age, the result of disease.

### WORK OF TRACTION PHYSICIAN

If the physician is to assume the place in the industrial life of this country for which his training fits him, he should be the guide, philosopher and friend of employer and employee, maintaining a health supervision over the industry and its employees which will increase efficiency and profits. The competent physician is a real dividend-maker for every corporation.

In the case of a traction company the general work of the physician should be as follows:

He should emphasize to the management the value of proper lighting as a means of increasing efficiency and preventing accidents to the employees, to the passengers and to the public at large.

He should suggest that car cleaning may be efficiently, cheaply and healthily performed by vacuum cleaning or other dustless methods.

He should indicate how rest rooms, with sanitary toilet facilities, individual wash basins, shower baths and cooled pure water increase efficiency and decrease accidents. For employees to discharge their duties with the utmost efficiency it is necessary that their hours of work be followed by mental and physical rest.

He should suggest, when indicated, that motormen be given protective glasses with lenses of Crooks or Feuzal glass to obviate the intensely harmful infra-red and ultra-violet rays from either the sun or the present high candle-power gas tungsten electric automobile headlight.

He should actively assist the management in its educational campaign for the prevention of accidents and the conservation of the health of all employees.

He should promptly render competent first aid and make the necessary redressings of all the accident cases that occur.

He should prescribe proper medical treatment for the acute or chronic illnesses of all employees, thereby assuring their return to health at the earliest possible moment.

He should physically examine all applicants for employment, re-examine all employees at a yearly interval and again make a re-examination before the employee resumes work after an absence due to either sickness or injury.

The physical examination of applicants for employment and their re-examination at stated intervals and after disabling accidents or sickness bears a very important relation to the accident problem of the American railroads. The failure to take proper care and the taking of chances are the cause of innumerable accidents, and it should be the duty of the employer to determine accurately through a physical examination by a competent physician that the employee is physically and mentally competent to take this proper care.

The value to be placed on any physical examination depends on the thoroughness with which it is performed. I do not consider a trainmaster or an air-brake inspector competent to determine the physical or mental qualifications of an applicant for employment in the operating or any other department of the railroad service. I am convinced that the examination of the heart, the lungs, the nervous system, the urine, and the determination of the blood pressure are equally as important as the examination of the eyes and the ears, and this presumes that the non-medical examiner has had the training to make the latter examination properly.

"Safety appliances require safe men to operate them" is an axiom too often disregarded by the management of American railroads. The most modern form of block-signal system is of no possible protection to any car at night when a color-blind motorman is at the controller, or at any time, if the motorman is lifeless from some disease, the presence of which would have been determined by a thorough physical examination. The employment of any man in the operating department of a railroad, without submitting him to an examination by a physician prior to his appointment, and the failure to re-examine him at frequent intervals, is courting a disaster which may be titanic in size, if not in name.

No company need hesitate over the question of expense, for the medical department can be made self-sustaining by charging the applicant a fee for the examination. In the electric roads, in nearly every instance, the cost of the examinations is placed on the applicant, the fee varying from 50 cents to \$2.50, but the average charge is \$1.

VALUE OF EXAMINATIONS

The value to the employer of physical examinations of his employees may be summarized as follows:

It can be stated as an axiom that the industrial efficiency of every employee is in direct proportion to the employee's physical and mental health. Physical examination detects concealed foci of disease and determines the presence of disease in the incipient stage when medical treatment has the best prospect of effecting a prompt cure with the minimum loss of time. A physical examination prevents the prospective employee from being placed at work which, by reason of physical defect, he is not able to perform in a competent or safe manner.

It places the employee who has physical defects into departments where his defect will not prevent him from being efficient and where he may work without physical injury to himself.

It either prevents, or assures an adequate defence against fraudulent claims by employees for personal injuries under the compensation act.

It is, when used at a yearly interval at least, a factor of material importance in the maintenance of all employees in a continuous state of physical and mental efficiency.

It prevents the employment of a person with defective color perception or vision as a motorman or in any other position that requires him to interpret signals.

The advantages of a physical examination to employees are:

It assures them a healthy fellow employee and prevents their being exposed to the danger of contracting syphilis, tuberculosis, smallpox, trachoma or other communicable disease from another employee.

It detects disease in its incipency and by its prompt treatment prevents or decreases the time lost through illness.

It assures the employee the prompt correction of physical defects, such as poor eyesight, hernia, etc., thereby increasing his efficiency and consequently his earning power.

It assures to the employee labor for which he is physically competent. The employment of a man with heart disease at a vocation requiring violent physical exertion might result in a fatality, etc.

It points out to the employee the value of fresh air, of securing proper rest, and of eating slowly and regularly as a means of conserving his health, and it also indicates the poisonous effects of alcohol.

It assures prompt and competent first aid and dressing of injuries, thereby facilitating healing and preventing infection.

It gives the employee knowledge of to whom to apply when either injured or sick.

COMMUNICATION

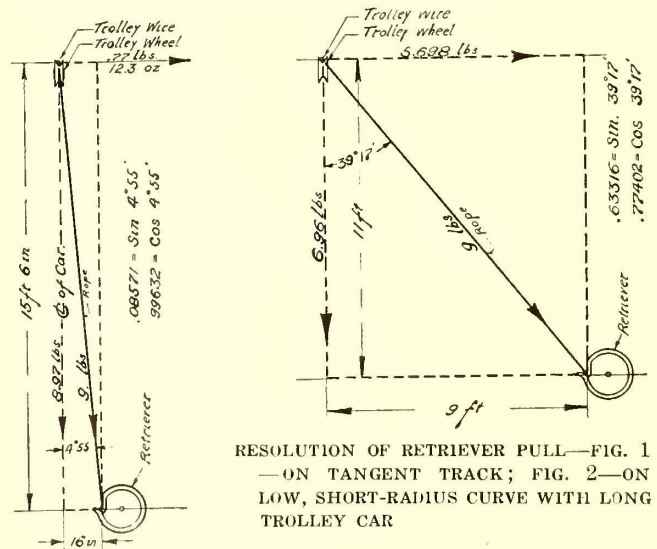
Why Trolley Wire Wears Out

UNITED RAILROADS OF SAN FRANCISCO

SAN FRANCISCO, CAL., Apr. 29, 1916.

To the Editors:

Replying to the article of C. I. Earll appearing on page 734 of the April 15 issue of the ELECTRIC RAILWAY JOURNAL, in which he disagrees with the claim that unsymmetrical trolley wire wear is caused in part by retrievers and attempts the unpromising task of proving that the side-pulling rope does not pull sideways, which



RESOLUTION OF RETRIEVER PULL—FIG. 1—ON TANGENT TRACK; FIG. 2—ON LOW, SHORT-RADIUS CURVE WITH LONG TROLLEY CAR

his rather vague statement that "an inclined rope does not pull the trolley wheel against the flange" apparently means, it would seem unnecessary to more than refer to Mr. Earll's task to see the impossibility of his succeeding.

By means of a parallelogram of forces (Figs. 1 and 2) the pull of an off-center retriever applied to the trolley wheel by the inclined trolley rope can be resolved into

two components. One is a vertically downward force opposing the upward pressure of the trolley pole, equal to the total pull from the retriever multiplied by the cosine of the angle between the rope and the perpendicular. The other is a horizontal force tending to pull the farther trolley wheel flange against the wire, equal to the product of the total retriever pull multiplied by the sine of the same angle.

These forces may not produce serious results in either direction but the tendencies always exist to do both. The horizontal component may be only a few ounces, as on straight track (see Fig. 1), but whether the trolley base pushes the wheel vertically upward with a force of 20 lb. or one of 20 tons those few ounces of horizontal force are certainly always present. This is absolutely proved by the fact that it pulls the trolley wire out of line between span-wire supports.

With a trolley pole pressing upward with a force of 20 lb. from a roller-bearing base, the 20-ft. high trolley wire was drawn  $1\frac{7}{8}$  in. out of line by a 5-lb. 16-in. off-center retriever pull in the middle of a span. The wire returned nearly to its original central position when the retriever pull was released.

With a 9-lb. retriever pull (Fig. 1) the wire was drawn  $2\frac{5}{8}$  in. out of line and returned when the retriever pull was removed. In this latter case the rope angle was 4 deg. 55 min., the horizontal component of the retriever pull was 12.3 oz. or  $8\frac{1}{2}$  per cent of the total 9-lb. pull, and the actual horizontal tension applied at right angles to the wire and required to draw the wire back to center against the retriever pull was between  $\frac{3}{4}$  lb. and  $\frac{7}{8}$  lb.

This simple experiment avoids the mathematics and at once puts beyond argument the question of whether the side-pulling trolley rope from an off-center retriever pulls sideways or not.

The impression evidently sought to be conveyed by Mr. Earll's drawings that, because the effect or the tendency or the limits of the resultant of the base pressure and the off-center retriever pull can be expressed in ten-thousandths of some unit, it is therefore by inference negligible, is like the plea of Marryat's unmarried young lady who did not see why they made such a fuss about her baby seeing that it was such a very small one.

Such a plea might pass when considering the wear on straight-line trolley wire because it would be difficult to prove that unsymmetrical trolley wire wear is synonymous with increased wear. Relative to wear on straight-line ears this plea has much less weight, for when one-half of a clinch ear is worn off that ear is all worn out as a support for the wire and unsymmetrical ear-wear certainly tends to cause more frequent rearing.

The retriever side pull is most prominent and destructive on sharp curves where the retriever on the end of the car may overhang the outside rail  $2\frac{1}{4}$  ft., the trolley wire may overhang the inside rail  $2\frac{1}{4}$  ft., the distance between the retriever and a point directly below the trolley wire may be over 9 ft., the rope angle may be 39 deg. and the horizontal component of the retriever pull may be 63 per cent of the total pull or, in the case of a 9-lb. pulling retriever, up to 5 2-3 lb. (Fig. 2). The linemen complain that the trolley wire wears out faster and the ears have to be replaced oftener than formerly there, while the conductors are occasionally seen to forestall the accident of the wheel leaving the wire by pulling several feet of slack out of the retriever when approaching these curves. Both classes of men refuse to be convinced or even interested in diagrammatic or symbolic mathematics claiming to prove that the side-pulling retriever is not mainly responsible, or that their troubles are all imaginary.

It was also found that when a trolley wheel had become worn to the limit of safety on one side of the central groove, the carhouse men were accustomed to turn the wheel in the harp in order to allow it to wear out on the other side. Possibly some of the wheels examined by Mr. Earll by day had been recently turned by the night carhouse men. A study of the wear on the trolley wire and ears that cannot so readily be reversed over night might have been less encouraging to Mr. Earll than inspection of trolley wheels, which really only cost about one-seventh as much per car-mile as trolley wire and are relatively unimportant.

Personally, all overhead men prefer the presence of retrievers on the cars to their absence if these devices are kept in order. The company pays for the trolley wire, not the men. There certainly are fewer broken span and pull-off wires now than in the old days. Span wire, however, costs only  $5\frac{1}{2}$  cents per pound, whereas trolley wire costs 32 cents, and there is more trolley wire used locally per car-mile now than before the retrievers appeared. Further, I am not sure whether the reduction in span-wire breakage is due to the retrievers or to our recent practice of increasing the size from  $\frac{1}{4}$  in. to  $\frac{3}{8}$  in. and the pull-offs to  $5/16$  in. I rather think the increase in size should have most of the credit for this reduced breakage.

As to Mr. Earll's final paragraph—"It is, so far as I have been able to ascertain, the universal experience that the maintenance cost of overhead wires is greatly reduced by the use of catchers or retrievers"—I can only report that the cost per car-mile for maintenance of overhead wires in San Francisco is considerably higher now than in most pre-retriever years. There is little glory for the retriever to be found in a comparison of San Francisco annual average overhead costs for the past thirteen years.

Mr. Earll's admission, "There are still many systems, especially in the cities, where neither retrievers nor catchers are used," is significant and may be interpreted as indicating that there are railway men in the East who anxiously feel that in buying retrievers what you pay is not all you pay.

That wire is found worn on both sides on curves is no acquittal of retrievers of side pulling. This double-sided wear is usually due mainly to one of two causes. Either the wire is not located accurately for the single type of car using it or there are several types of cars passing so that the wire is too far in for some and too far out for others, presenting the conditions that cause the excessive scraping that prevails between wire and wheel in advance of a frog when a car is turning off the main line or as Mr. Earll's right-hand diagram portrays.

With a properly located curve wire and a single type of car using it, the wear on the wire will be a minimum. With a 4-lb. or 5-lb. retriever side pull added, there will be side wear added to the wire, or there is no such thing as logic or value in the testimony of men engaged in renewing curve trolley wire.

The side pressure involved in the use of the retriever is not to be viewed as an unpardonable objection to its use, but rather as a partial compensation for its good qualities and as an abrasive action on the trolley wire and ears that should be minimized where possible. Judging by the general practice most railway men feel that good retrievers on the whole are well worth all they cost.

S. L. FOSTER, Chief Electrician.

The Railroad Commission of California, San Francisco, Cal., has just published Volume 7 of its opinions and orders, this covering the period from June 1, 1915, to Aug. 31, 1915.



1916 CONVENTION  
ATLANTIC CITY  
OCTOBER 9 TO 13

## ASSOCIATION NEWS

1916 CONVENTION  
ATLANTIC CITY  
OCTOBER 9 TO 13

Attention of Milwaukee Section at Last Meeting Directed Toward Track Construction, Operating Rules and Schedules—Connecticut Section Hears Addresses on Power Generation and Other Topics—Correspondence Course Graduates

### MILWAUKEE SECTION

The regular monthly meeting of the Milwaukee Section (company section No. 1) was held on the evening of April 27. The regular order of business was followed by a limited quiz period, after which the meeting proceeded to the reading of committee papers.

C. L. Smith of the way and structures civil engineering department presented the report of the committee on roadway, taking up first the matter of "Roadway—Open Track Construction." In his treatment of this subject he considered the location of roadway, purchase of right-of-way, procurement of franchises, construction of lines, drainage, ballast, ties, rail fastenings and joints, crossings, cattle guards, etc., and offered the committee's recommendations, as follows:

1. That wider subgrades be constructed for both cuts and fills.
2. That all subgrades should be sloped for drainage purposes.
3. That sod strips be placed along the subgrade shoulder.
4. That all slopes be covered with vegetation wherever washing of the surface occurs, if possible.
5. That 5-in. 80-lb. T-rail be used as a standard interurban rail.
6. That the standard tie for interurban track be a 6-in. x 8-in. x 8-ft. white oak.
7. That 10-in. of gravel ballast be placed beneath the ties, and if crushed stone is used the stone should be carried to a depth not less than 8-in. beneath the ties.
8. That continuous joints be used and that the blocks employed be creosoted.
9. That a cast-iron pipe be used in place of tile for drain.
10. That the gravel insert type of roadway crossing as shown be adopted as standard.

The matter of "Roadway—Paved Streets" was next taken up, and in this connection the factors having an influence upon the design were enumerated as follows:

1. Character, bearing power and drainage of sub-soil.
2. Effect of electrolysis.
3. Live load to be carried.
4. Form of substructure necessary to distribute the load over the subsoil.
5. Form of superstructure to be carried by the substructure.
6. The question of street improvement with respect to line, grade, paving and subsurface structures.
7. Street and car traffic condition under which the work is to be executed.

From the conclusions reached in the discussion of this subject the committee had the following recommendations to offer:

1. That the question of drainage receive most careful consideration and wherever present practice is inadequate a drain should be installed in the dummy.
2. Two types of foundation construction, as shown, be adopted as standard, the condition of the subsoil and other factors to control and govern in the selection of the type to be used.
3. That crusher-run crushed stone, varying in size from ½-in. to 3-in. be adopted as the standard ballast material and that a depth of 8 in. below the tie be adopted.
4. That the standard tie for tangent track construction in the city streets be a 6-in. x 8-in. x 7-ft. long-leaf yellow pine tie.
5. That the 7-in. 95-lb. and 6-in. 72-lb. T-rails be adopted as standards, depending upon the degree of rail service required.
6. In fastening the rail to the tie ¾-in. x 5-in. screw spikes be used in place of the hook head track spike.
7. That surface drains be installed at all low places to assist in carrying off the surface water.

Following the presentation of this report, C. H.

Cross, chief safety inspector, reported on behalf of the committee on rules and regulations, stating what had been done along the line of formulating definite rules and regulations. He said that the practices prevailing in the several divisions of the company were being assembled with a view of providing:

1. General rules.
2. Rules for emergency duties.
3. Standardization of specifications for employment.
4. Definitions defining tools and various devices in use.
5. Specifications for materials.
6. Accident reports.
7. General inspection, etc.

The third paper of the evening was one presented by Fred W. Yeo, superintendent of schedules, on behalf of the committee on construction of time-tables. Mr. Yeo outlined the requirements imposed upon the railway in the way of service standards, and described the method employed for securing the data necessary to the construction of time-tables to meet the prescribed service.

### CONNECTICUT COMPANY SECTION

The sixth regular meeting of this section was held in New Haven on May 2. It was the largest meeting yet held, the membership having now passed the 200 mark with the goal set at 250 members by the date of the June meeting.

Henry G. Stott, superintendent of motive power Interborough Rapid Transit Company, gave an address on "The Development of Power Generation Systems as Applied to Electric Railways." Short papers were also read by C. H. Chapman, manager Bridgeport division, on "The Greater Responsibility of Railway Labor;" by H. L. Wales, superintendent Waterbury division, on "Transportation and Traffic Problems on the Waterbury Lines," and by W. P. Bristol, manager Hartford division, on "The Transportation Problems of the Hartford Division."

For the committee on snow-fighting equipment, P. Ney Wilson reported that three sub-committees had been formed to report on equipment, disposal of snow, and organization, respectively. The reports of these will be consolidated into a general report. The president, W. J. Flickinger, announced that the section bowling team had been successful in a contest with the team of the New Haven Railroad.

### GRADUATES OF THE CORRESPONDENCE COURSES

In announcing the names of the latest graduates in the American Association correspondence courses the word "first" was inadvertently used in the caption in place of "latest." The record department of the International Correspondence Schools reports the following as having completed their courses to date: J. H. McWhorter, Atlanta, Ga.; L. E. Green, Columbus, Ga.; Georges Trottier, Montreal, Province of Quebec; W. A. Wallace, Fort Worth, Tex.; H. R. Briggs, New York; B. H. Hall, South Connellsville, Pa.; George Doucette, Waltham, Mass.; Karl Shaver, Exchange, W. Va.; W. C. Bush, Fruita, Col.; Andre Harduck, New York; F. B. Sebastiana, New York, and Clement Gordon, Lemoyne, Pa. To Mr. McWhorter belongs the honor of first completing one of the courses.

# EQUIPMENT AND ITS MAINTENANCE

Short Descriptions of Labor, Mechanical and Electrical Practices  
in Every Department of Electric Railroading

*Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.*

## The Automatic Substation

That the recent development of automatic control for substations bids fair to revolutionize existing practice in power distribution can hardly be denied when once the innovation's far-reaching influence is considered. Automatic control is not, as might be supposed, merely a means for reducing the labor charges involved by the presence of substation attendants. On the contrary, it serves as an economical substitute for excessive feeder copper, provides an opportunity to reduce electrolysis and, when intermittent car service has to be furnished, saves material amounts of energy by reducing light-load and line losses. Its application to electric railway service has, in fact, enormously increased the field of usefulness for 600-volt power in both interurban and suburban service and it has even furnished a possible alternative to the excessive concentration of high-capacity units in a few monster substations that has become common in large cities.

The possibility of use in the latter class of service, perhaps, brings out better than any other example the real meaning of the automatic substation to the electric railway industry. In cities where the stations are of really great capacity the cost of attendance becomes almost negligible, and automatic operation, if it was introduced, would have to depend altogether upon other features to warrant even superficial consideration. Yet some at least of the engineers who have had to do with the first installation of the kind to be made—that on the Elgin & Belvidere Electric Railway, described in the *ELECTRIC RAILWAY JOURNAL* for Sept. 18, 1915—feel that it is a reasonable possibility. The major reason is the chance to reduce the complication and extreme costliness of feeder and return facilities required when the distribution of excessively large amounts of power is effected from only a few points, and it is conceivable that it would be cheaper to install smaller substations and more of them than to carry the tendency of concentration to its logical conclusion. In addition, automatic control brings with it the elimination of possible labor troubles and also improved efficiency of operation because of ability to work each rotary converter only when its services are actually needed, and not in accordance with the fixed schedule demanded when the control is subject to human limitations.

For the immediate future, of course, the possibility of automatic substations in city service is hampered by the fact that converters of 1000-kw. capacity seem to be about the maximum size that may be operated in this manner. There is a lack, at the present time, of fully-developed devices, such as circuit breakers, to handle the heavy amperages involved with 600-volt converters of greater size. Automatic substation control thus far has made use of devices that are strictly standard in all respects, and any extension of the principle to rotaries of unusually large size would necessitate the production of control equipment of corresponding current-handling ability, although such equipment is perfectly susceptible of development when a demand for it takes form.

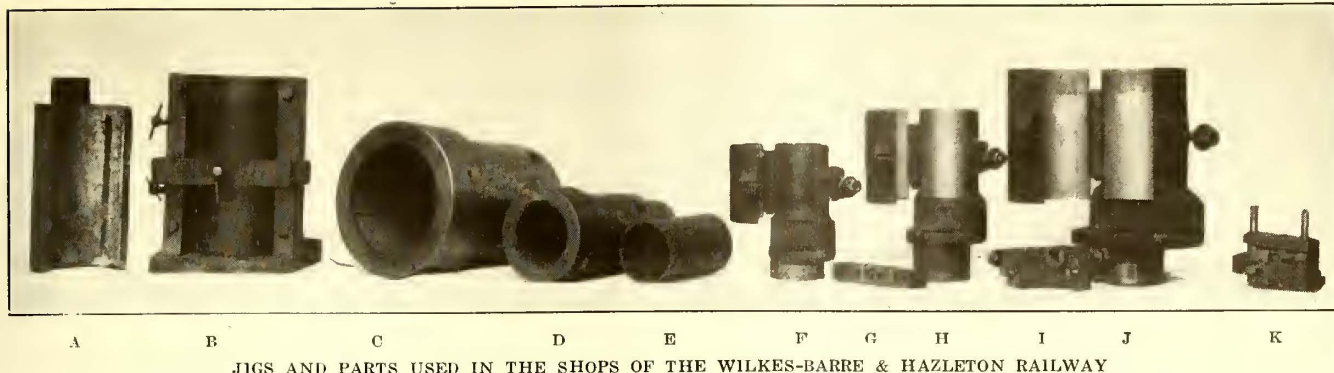
To-day, therefore, the important field is in interurban and suburban service, including also operation on city lines where traffic is intermittent. Under such circum-

stances the item of labor is a material one in substation operating costs, and it accounts for the present tendency to group converters or to install units of large size at infrequent intervals along the route. This in turn necessitates either heavy expenditures for feeder copper or else poor line-voltage conditions and heavy line losses at outlying sections, the latter alternative being most common in interurban practice.

Where a substation equipment consisted of two or more units it is manifest that almost invariably it would be preferable to separate them, using automatic control, and thus to reduce the feeding distance for low-tension energy. This would cut down the line losses and at the same time would improve schedule speed. Opposed to these direct economies would be the expense involved by the automatic control equipment and by having to house the converter that would be moved to a new location. However, in the case of small units at least, the capitalized labor saving would more than offset this expenditure. In addition there is an indirect economy which accompanies automatic control and more frequent substations, because the size of each converter can be selected with less margin to provide for unusual overload. On a line where several automatic substations are working, it is impossible for any one of them to be overloaded, because the resistance circuit breaker that forms a part of every equipment takes care of sudden peaks, reducing the effective voltage on the line when an overload takes place, and causing the substations on either side of the overloaded section to start feeding into it. Thus, when the substations are spaced at sufficiently short intervals and the car service is intermittent, the condition is approached whereby the peaks in the load do not have to be carried by extra machines installed at each substation. Instead, the peaks are carried by drawing upon converters in adjoining substations which would otherwise be idle, and although the power thus furnished involves a considerable line loss, there is no doubt but that in many cases the loss would be more than offset by the improvement in load factor of the rotaries.

This automatic adjustment to load conditions by starting up the machines only when needed may be made dependent upon practically any one of the factors involved in operation. Rotaries may be cut in on the line by a change in current, voltage or power factor. They may be brought in by means of a clock mechanism or by pilot wires from any desired remote point. For the substation itself the best procedure, and the one that has been adopted on the Elgin & Belvidere Railway, is to place gratings over the windows and lock the door, leaving the place absolutely untenanted except during a short inspection period that may be made each day. For such inspections an intelligent attendant is required, and the amount of work that he can cover depends simply upon the distance between substations and the facilities provided for transportation between them. The actual inspection of any one substation requires less than one-half hour, it being necessary only to look over the lubrication, examine the brushes and collector rings, feel the bearings, and inspect two small relays and an interlock on the cutting-in contactor.

In so far as accidents need be considered, it is felt



JIGS AND PARTS USED IN THE SHOPS OF THE WILKES-BARRE &amp; HAZLETON RAILWAY

that this whole phase of substation operation is but little changed by the presence or absence of an attendant. In case of a runaway machine, if it is shunt-wound and if the shunt field is lost, the most common cause of such accidents, the machine will run away in the normal direction of rotation and the time interval will be too short to permit the attendant to do more than to jump through a window. The machine is going to be destroyed in any event. In the case of a compound-wound machine, the loss of the shunt field will cause the converter to slow down, stop and start up in the opposite direction, running away if not cut out immediately. In this case, there is an element of time between the failure of the field and the arrival at a disastrous speed in the reverse direction, and it is thus possible for an attendant to save it, although experience has shown that this is not always done. With regard to fires, there is so little for an operator to do in case of the establishment of a conflagration in a modern substation that the hazard is not appreciably changed by his presence or absence. In the case of flashovers, which are generally brought about by short-circuits or abnormal loads outside of the station, it has been found that the current builds up gradually enough so that the resistance circuit breaker will take care of the difficulty. In fact, the time interval before the flash actually takes place is believed in general to be long enough to prevent the machine from being damaged in any respect because, the resistance that is automatically introduced into the circuit definitely limits the flow of current.

### Jig Practice at Hazleton, Pa.

BY JAMES W. BROWN

Superintendent of Shops Wilkes-Barre & Hazleton Railway,  
Hazleton, Pa.

The accompanying illustrations show a number of jigs which we have found valuable in our repair work.

Beginning at the left of the illustration is shown a main journal bearing, *A*, which is used on our 60-ton locomotives. This bearing is babbitt-lined, weighs 60 lb. and is 6 in. in diameter. The jig for holding this bearing while it is being rebabbitted is shown at *B*.

The next two figures show barrel chucks, the larger of which, *C*, is used in boring and facing GE-69-C motor-axle bearings. *D* is used in boring and facing GE-66-B pinion-end armature bearings, and the sleeve shown at *E* is used in *D* in boring commutator-end bearings. It is also used in boring GE-69-C commutator-end armature bearings, and Westinghouse 101-B2 pinion and commutator-end armature bearings.

The other three large figures are split chucks. *F*, which has been in use for several years, takes both pinion and commutator ends of Westinghouse No. 3 and No. 12 armature bearings. *H* takes GE-90 armature bearings, and *J* takes GE-90, GE-66-B and GE-254 motor-axle bearings for boring and facing.

The small jig shown at *K* is used in drilling and ream-

ing holes that have been badly worn in the operating levers of Type M multiple-unit control contractors, preparatory to bushing them to the original diameter.

The small jig shown at *I* is for use with worn tops of the GE Type M master controllers. The jig is clamped to the face-plate of a lathe by the two bolts shown on the end of the jig. Then the controller is clamped on the jig by the two  $\frac{3}{8}$ -in. bolts shown, and made to run true. After this jig is once set it is ready to take as many tops as may have to be renewed. All that is necessary is to clamp the controller on the jig by the two stud bolts as shown.

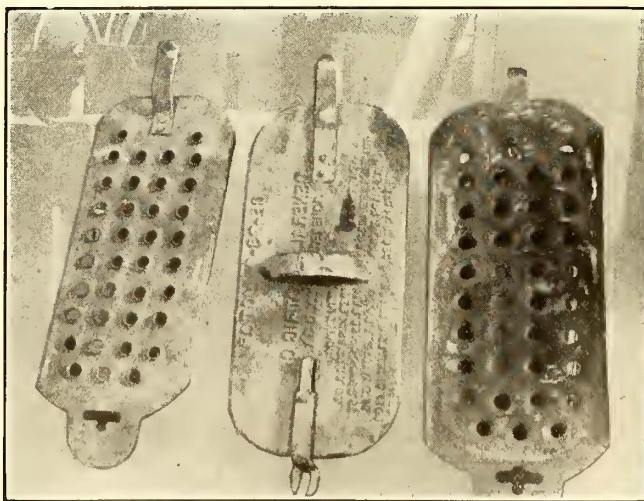
The small, narrow jig at *G* is used for holding third-rail terminals while drilling.

### Winter and Summer Motor Covers Effect Economy

BY M. F. FLATLEY

Master Mechanic Terre Haute, Indianapolis & Eastern Traction  
Company, Lebanon, Ind.

The substitution of perforated, pressed-steel covers for the cast covers of unventilated railway motors during the summer months reduces the motor temperatures from 18 deg. to 20 deg. Fahr. and eliminates troubles arising from high temperatures. This practice has been followed by the mechanical department of the Terre Haute, Indianapolis & Eastern Traction Company, Lebanon, Ind., with very satisfactory results. The older type motor covers, as furnished by the manufacturers, provide practically no ventilation, which is unnecessary during periods of low temperatures, but lack of ventilation is largely responsible for many motor difficulties during the summer months. The perforated pressed-steel cover and the standard cast-steel cover which are used on a GE-73 motor, are shown in an accompanying



VENTILATED COVERS FOR SUMMER USE ON GE-73 MOTORS

illustration. Aside from the value of obtaining ventilation during the summer months, the summer cover weighs only 5½ lb. as compared with the cast-iron cover, which weighs 15½ lb. The pressed-steel covers are made in the railway company's shops, and consist of 12-gage sheet steel drilled with 9/16-in. holes which are afterward punched to ¾-in. tapering holes. By this process raised flanges are formed on the outside of the cover and serve to prevent dust from falling on the commutator. The pressed-steel ventilated summer cover costs approximately 65 cents, whereas the cast-steel cover costs \$1.51. The net saving in weight is 9 lb. and the saving in cost is 86 cents. In like manner the lower handhole plates are also removed from the motors and replaced with sheet-steel covers.

## Hydrostatic Tests of Corrugated Culverts\*

BY GEORGE L. FOWLER

Consulting Engineer, New York City.

An extensive investigation has recently been completed looking to the determination of the collapsing strength of corrugated culverts as made of Armcro (American ingot) iron. For the hydrostatic tests the pipe tested was placed in a closed cylinder and subjected to an external hydrostatic pressure until it collapsed.

The pipe investigated was of three internal diameters, namely, 12 in., 24 in. and 48 in. The pipe was further formed of two depths of corrugation, to-wit, ½ in. and ¾ in., with a uniform pitch of 2 2/3 in. The pipes were double riveted on the longitudinal and single riveted on the circumferential seams, with a longitudinal pitch of 2 2/3 in. and a circumferential pitch of about 8 in. The sheets and rivets of all pipe were galvanized.

For each diameter of pipe the strength with two depths of corrugation was tested and, for each depth of corrugation, the work was done with four thicknesses of metal, namely, No. 16 gage (0.0625 in.), No. 14 gage (0.078 in.), No. 12 gage (0.109 in.) and No. 10 gage (0.141 in.).

As no data were available upon which to proceed, the first tests were made with pipe 12 in. in diameter and 8 ft. long. This length was selected because D. K. Clark had found in earlier experiments in the determination of the crushing strength of plain cylindrical furnaces that the influence of end support or bracing did not extend inward more than 2 diameters. Hence it was assumed that a total length of 8 diameters would be sufficient to avoid all influence of end bracing and support, and this was found to be the case.

Each piece of pipe tested was fitted at each end with an internally projecting flange made of angle and riveted to the inside of the pipe. These flanges were faced off parallel to each other and at a distance of 8 ft. They were further drilled for ½-in. bolts to match the head of the casing in which they were tested.

A caliper was provided by which any diameter could be measured to within 0.02 in., and at the start, before the application of any pressure, the vertical and horizontal diameters at each internal corrugation were measured. The same measurements were made at the application of each increment of pressure, these increments being varied with the diameter of pipe, thickness of metal and depth of corrugation.

It was characteristic of all of these pipes that, in yielding, they collapsed suddenly upon the attainment of the maximum pressure, and that, when following up the collapse by working the pump, it was invariably impossible to attain the maximum pressure again. This was

to be expected, because of the weakened condition of the pipe, which caused it to continue yielding under a reduced pressure.

At the conclusion of the tests with 12-in. pipe, it was found that the support afforded by the casing which was to form the basis for deciding upon the lengths of pipe to be used in the hydrostatic tests of 24-in. and 48-in. diameters did not extend inward, on an average, for more than 2 diameters from the end.

The pipe probably collapsed at its weakest point, but it is interesting to note how the distance of collapse from the end decreased with the increase of the natural stiffness of the pipe. This may, however, have been a mere coincidence, as there are not sufficient data to establish a conclusion that the influence of end support is greater with a weak pipe than with a stiff pipe, although there were other instances in the tests that tend to support such a conclusion.

As it was understood that the end support does not influence the strength of the pipe for more than 1¾ diameters on an average, it was considered safe to adopt a length of 12 ft. of pipe of 24-in. and 48-in. diameter that were to be tested.

Tests were also made of a set of smooth pipes 12 in. in diameter, made up in the same way and of the same thickness of metal as the corrugated pipe. The object of this was not so much to secure data for the develop-

TABLE I—HYDROSTATIC COLLAPSING PRESSURE OF CORRUGATED CULVERT PIPE

Diameter of Pipe, Inches	Gage of Metal	Depth of Corrugation, Inch	Collapsing Pressure, Pounds per Square Inch
12	16	½	225
12	14	½	275
12	12	½	420
12	10	½	450
12	16	¾	360
12	14	¾	380
12	12	¾	490
12	10	¾	630
24	16	½	52
24	14	½	75
24	12	½	130
24	10	½	160
24	16	¾	100
24	14	¾	100 (125)
24	12	¾	180
24	10	¾	320
48	16	½	15
48	14	½	20
48	12	½	33
48	10	½	58
48	16	¾	29
48	14	¾	39
48	12	¾	45
48	10	¾	70

ment of a formula by which the collapsing strength of smooth pipe could be calculated as it was to obtain a rough comparison between the collapsing strength of corrugated culvert pipe and a smooth pipe of the same material made in essentially the same manner.

On tabulating the collapsing pressures of all of the pipe tested it was found that a ½-in. depth of corrugation increased the strength about three and one-half times with No. 10 gage metal, five and one-fourth times with No. 12 gage, seven times with No. 14 gage and six times with No. 16 gage. These ratios must be increased by 50 per cent if a comparison is to be made with pipe having a ¾-in. depth of corrugation.

As the object of the tests was to develop a formula by which the probable strength of other diameters of pipe made of various thicknesses of metal could be calculated, that phase of the subject will now be considered. Such a formula can, however, only be considered on the basis of a probability, and not as having been demonstrated as proved. The data obtained are insufficient for a complete demonstration, although they are of such a character as to indicate the probability of reliability.

There were three diameters tested for each depth of corrugation and thickness of metal to supply three points on the curve developed from a formula. The

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results are, of course, open to the objection that the three points may not represent true averages, as the pipe was made up in the ordinary course of manufacture and was subject to all of the variations due to that method of treatment. With this statement of the limitations imposed, however, the matter will be discussed.

First, it will be well to review the results obtained by tabulating the collapsing pressures of the several pipes tested. The results were as given in Table I on page 915.

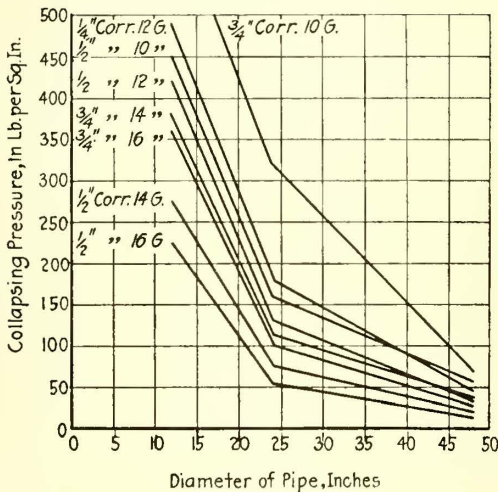
The results are plotted in an accompanying diagram. The lines connecting the several points of failure show that the pressures do not vary inversely as the diameters, as might have been expected and as they are formulated in the rules of Lloyds and the United States for the working pressures allowed on corrugated furnaces. This point will be discussed later.

As between the 12-in. and 24-in. diameters of pipe, this ratio holds for the heaviest metal (No. 10 gage) and the smallest pipe. As the thickness of metal decreases the ratio of the collapsing pressure of the 24-in. pipe to that of the 12-in. pipe increases, until with No. 16 gage and 1/2-in. depth of corrugation the ratio becomes about 4 1/2 to 1, while the ratio between the 48-in. pipe and 24-in. pipe is never less than 1.75, and runs from that to 4 1/2.

There are three variables to be considered in the development of this formula, namely, the diameter of the pipe, the thickness of the metal and the depth of the corrugations. From the table of collapsing pressures above it will be seen that the average collapsing pressures of pipe having 1/2-in. depth of corrugation was almost exactly two-thirds of that having a depth of 3/4 in., so that for this pipe it is assumed that the strength varies with the depth of corrugation.

It must be borne in mind, however, that this law might not hold if other depths of corrugation were introduced. But with only two points of the curve known it is impossible to consider the connecting line between them other than as straight.

Grouping the several thicknesses of metal used on the same ratio, considering the No. 16 gage as 1, we have:



COLLAPSING STRENGTH OF CORRUGATED IRON CULVERT PIPE

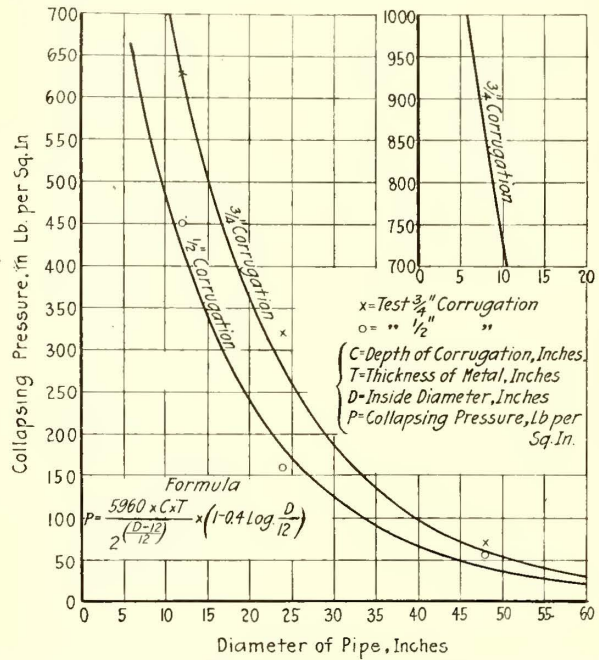
No. 16 gage, 1.00; No. 14 gage, 1.25; No. 12 gage, 1.75; No. 10 gage, 2.25.

Then grouping the collapsing pressures of each gage of metal for all diameters we have the results shown in Table II. Here the maximum variation of calculated from actual collapsing pressure was about 6.6 per cent.

So, again, in the development of the formula it was assumed that the strength of the pipe varied with the

thickness of the metal, and in this it checks with both the Lloyds and the United States formulas for corrugated furnaces. The effect of diameter then remained the only variable to be analyzed for its effect on the strength.

Taking the No. 10 gage pipe having 3/4-in. corrugation for the 12-in. and 24-in. pipe as a basis, we find the strength to be as 2 to 1 approximately. While the corresponding ratios between the 24-in. and 48-in. pipe



CALCULATED COLLAPSING STRENGTH OF NO. 10 GAGE CORRUGATED IRON CULVERT PIPE

are approximately as 4 to 1. It was merely a matter to divide the product of the thickness and the depth of corrugation by 2 with an exponent of 0 for a 12-in. pipe, 1 for a 24-in. pipe and 2 for a 48-in. pipe. Such an exponent is to be found in the expression:

$$\phi = \frac{D - 12}{12}$$

As both the depth of corrugation and the thickness of metal were less than 1 in., it was necessary to provide a constant that, used as a coefficient, should place the calculated pressure for the 12-in., No. 10 gage pipe approximately at the actual collapsing pressure. This pressure was 630 lb. for the pipe with 3/4 in. depth of corrugation. Then  $630 \div (0.75 \times 0.141) = 5960$ . Hence 5960 was taken as the coefficient. The formula thus developed is as given:

$$P = \frac{5960 \times C \times T}{2 \left(\frac{D - 12}{12}\right)^2}$$

In which

- P = collapsing pressure in pounds per square inch.
- C = depth of corrugation in inches.
- T = thickness of metal in inches.
- D = inside diameter in inches.

But this formula gave results that were too high for the 24-in. and 48-in. pipe, so that another factor which was a function of the diameter was required, a factor

TABLE II.—COLLAPSING PRESSURE AND GAGE OF METAL

Gage of Metal	Calculated Collapsing Pressures on Basis of Ratios, Lb. per Sq. In.	Average Actual Collapsing Pressure, Lb. per Sq. In.
16	130	130
14	162	152
12	227	219
10	291	281

that should be unity when the diameter was 12 in., and which should increase with the diameter.

Such a factor was found in the expression

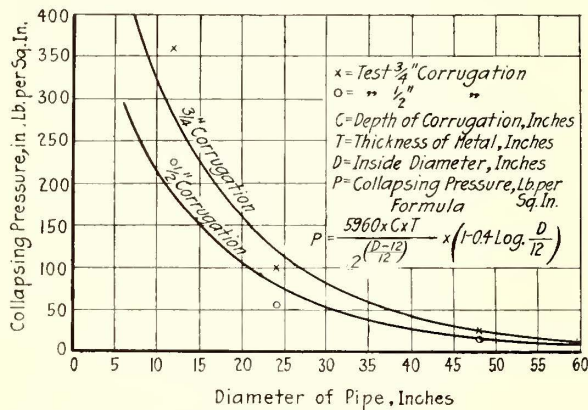
$$\left(1 - 0.4 \log \frac{D}{12}\right)$$

from which the final formula becomes

$$P = \frac{5960 \times C \times T}{2 \left(\frac{D-12}{12}\right)} \times \left(1 - 0.4 \log \frac{D}{12}\right)$$

In the accompanying diagrams of collapsing strength the actual collapsing strength of pipes of the several diameters and for the two thicknesses of No. 10 and No. 16 gage is plotted and lines are drawn based on the formula as developed. These show the value for the extreme thicknesses, and they will be seen to be a little high for the 24-in. pipe, a little low for the 12-in. pipe, and closely accurate for the 48-in. pipe. It may be considered that for working purposes these tables are reliable and that it will be safe to subject culverts to a working pressure up to 60 per cent of the values given.

The United States rule for determining the allowable working pressures of corrugated furnaces is to multiply the thickness of the sheet by a constant and divide by the diameter, with a thickness of sheet limited to 5/16 in. as a minimum. The formula makes the allowable working pressure vary inversely as the diameter, but an examination of the tests made by the



CALCULATED COLLAPSING STRENGTH OF NO. 16 GAGE CORRUGATED IRON CULVERT PIPE

government shows that the collapsing pressure does not vary inversely as the diameter. If we divide the thickness of sheet by the diameter the quotient should represent the collapsing pressures of different furnaces. On the basis of such a ratio there is marked variation therefrom in the actual collapsing strength of the different furnaces tested. Then if the allowable working pressures as determined by the formula are compared with the actual collapsing strength of the furnaces, it will be found that the factor of safety varies from 6.76 to 8.16 in the range of furnaces tested.

If, now, we take the same liberty with the data obtained for the collapsing pressures of corrugated culverts and the formula that has been developed therefrom, it becomes possible to evolve a simple formula for the allowable working pressures to which such culverts might safely be subjected. If we assume a factor of safety of 2 for the working pressure, and allow the same flexibility in the development of the formula that was taken in the development of that for corrugated furnaces, we find at once an unexpected latitude. The formula for the collapsing pressure of corrugated culvert pipe was developed to cover all diameters of pipe, and we have seen that the results do not vary inversely as the diameter. In like manner the collapsing pres-

ures of corrugated furnaces do not vary inversely as their diameters, but through the narrow range of diameters covered by such furnaces in practice, from 30 in. to 56 in. or thereabouts, this variation from the true inverse ratio is disregarded in the formula for the working pressures of such furnaces.

If, now, we consider corrugated culvert pipe through the same narrow range and work on the same ratios of thickness of metal to diameter of pipe, it is possible to construct a formula similar to that used for the working pressures of furnaces that will express the allowable working pressure for corrugated pipe. For example, the range of diameters for corrugated furnaces runs from 30 to 60 in. and the thickness of metal from 1/2 in. to 5/8 in. That is to say, the ratio of the thickness to diameter runs from about 70 to 170 to 1. On this basis we should take the corrugated culvert pipe of diameter from about 10 in. to 24 in., as the thickness of metal of the tested pipe ran from 0.0625 in. to 0.141 in.

If, then, we work within this narrow range of sizes, and for a working pressure that bears a ratio of 1 to 2 of the collapsing pressure, the calculation for such a working pressure may be expressed by the formula

$$WP = \frac{34,000 \times C \times T}{D}$$

In this the symbols have the same meaning as before. We thus have a formula identical with that used for calculating the pressure of corrugated furnaces and equally as accurate. Should it be desired to work to a larger factor of safety, it is merely necessary to make a corresponding reduction in the constant factor of the formula.

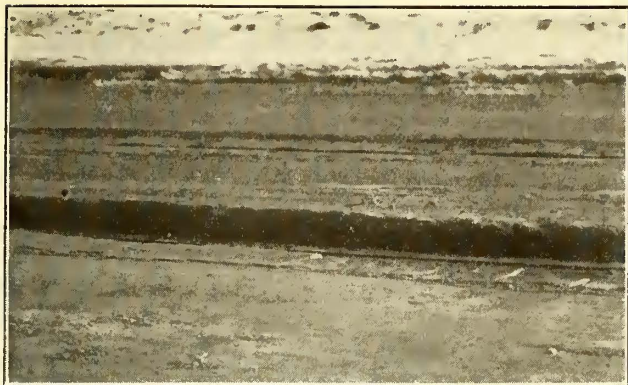
The foregoing tests were undertaken with a view to securing information preliminary to the planning of tests under sand beds in which conditions of culvert installations in railway practice should be duplicated just as closely as possible.

## Effects of Low Temperature on Paving in the Track Allowance

The accompanying illustrations show the damage produced by severe frost in Seattle, Wash., and elsewhere during the protracted cold weather of last January. They are typical of the conditions existing in other cities in the North Pacific States. No particular type of pavement appeared to be immune from the effects of cold, and only those streets containing railway tracks were affected.

The average winter temperatures of the North Pacific Coast cities are comparatively high and very equable, that of Seattle for the months of November, December, January and February for the past five years being 42.35 deg. Fahr. For the past ten years the average for the same months was 42.33 deg., the maximum range of average monthly temperature for these months during the entire ten years being only 15 deg. The lowest temperature recorded during the last ten years was on Jan. 15, 1907, when the mercury reached 11 deg. above zero. The greatest duration of low temperature, with the exception of January, 1915, was in the same month of the same year when there were twenty days whose minimum temperature was under 30 deg. These days, however, were not of consecutive duration.

Between the dates of Dec. 29, 1915, and Feb. 1, 1916, there were twenty-seven days on which the minimum temperature was less than 30 deg., the average mean temperature being 31 deg., so that this is the longest duration of low temperature that has visited Seattle during the past ten years. Corresponding conditions were felt in other coast cities. There was a light snowfall at intervals during the month of January which had

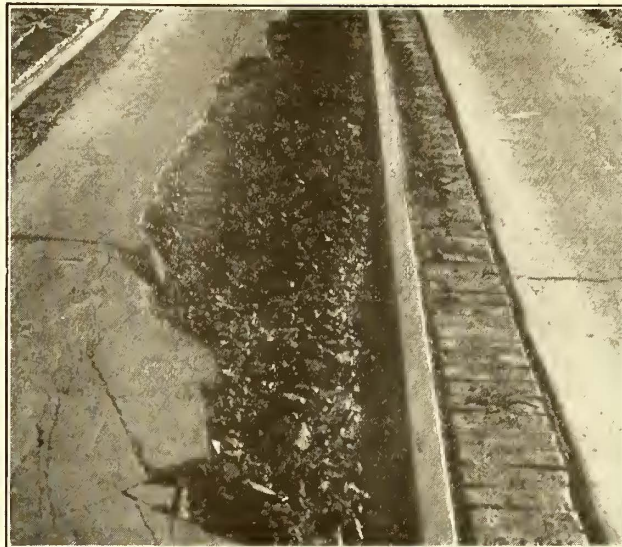


ASPHALT PAVING HEAVED 2½ IN. BY FROST

the effect of continuing the refrigeration during the few days when the minimum temperature was above freezing, but there was never at any time during that month more than a few inches of snow on the ground at one time.

The first illustration shows the general condition of heave of the paving brick along an asphalt section. The brick in all cases were originally laid so that their tops were coincident in elevation with the top of the rail. As shown, the top of the brick is approximately 2½ in. above the top of the rail, and this condition existed at this location for a distance of about 100 ft. in each case, the brick gradually receding to an elevation of about ¼ in. above the normal for the remainder of the block. The brick next to the track is of a bull-nosed pattern, as may be seen in the adjoining view, which shows the brick removed on the same street a few blocks away. This street is in a residence district and supports a medium residence traffic of light vehicles, principally automobiles, and has been in service since 1908 and 1909. The bricks were originally laid on a sand cushion with cement grout. A filler of the same material was run between the brick and the track, but this has long since been broken away by the street car and other traffic and has left practically no filler between the brick and the rail. The second illustration shows the frost action upon the brick and asphalt between the tracks. It will be noted that the bricks here shown have been raised both on the outside and inside (on the left-hand track) of the rail. The breaking of the asphalt continued at intervals over a number of blocks in more or less degree. This part of the street was paved in 1908, the roadway being 40 ft. in width. The gradient is less than 1 per cent.

The two illustrations below show a street paved entirely with vitrified paving brick, 8½ in. x 4 in. x 2¾ in., the exposed edges of which are rounded to a radius

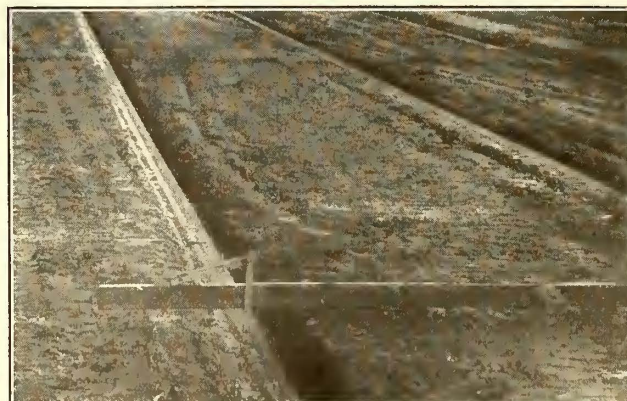
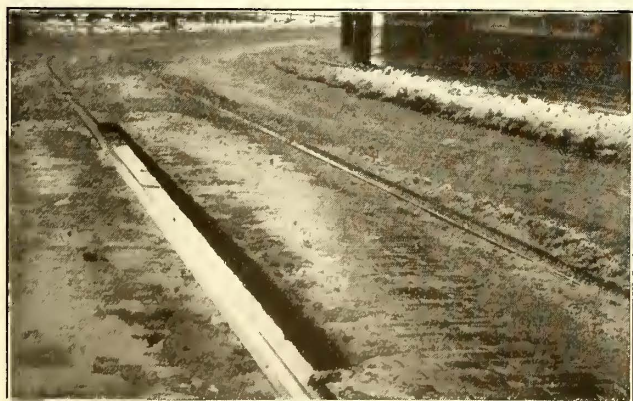


DAMAGE TO ASPHALT PAVING DUE TO FROST

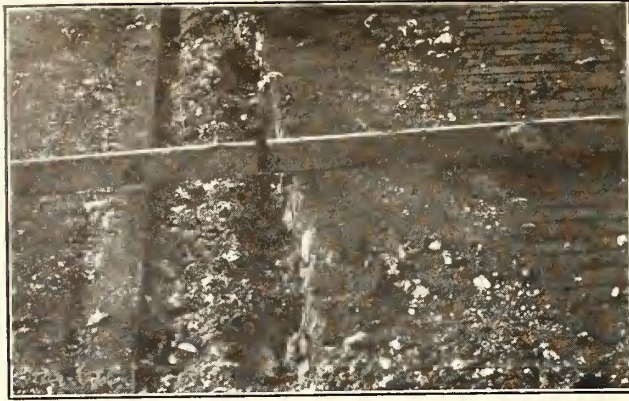
of ¼ in. The paving was laid in 1909 and sustains a heavier traffic than the previous street noted, but could not be termed a heavy traffic thoroughfare. The width of roadway is 60 ft. and the gradients vary from 5 to 0.05 per cent. This street showed a consistent raising of the brick on both the inside and outside of the car tracks and only at intervals were large heaves noted. In one case shown about 55 lineal feet of brick between the tracks had been removed, as the rise of the brick in that portion had been high enough to interfere with street car traffic. Numerous instances, particularly at cross streets, showed the effect of the impact of traffic on the paving material that had been forced above the grade of the tracks. In more cases of this kind the material was either forced out or reduced to small pieces, as shown in the fourth view. The gradient at this point is 2 per cent and the width of roadway 44 ft.

On page 918 are shown pictures of other effects on brick paving. One is from a pavement laid five years ago, where the brick along the car tracks has been removed because of its interference with traffic. The grades on these streets are light and the traffic of medium character. The tracks shown had in most cases been cleaned and been kept clear of snow by the car traffic. The other shows a track in a small town in northern Oregon which had not had the advantage of constant traffic and cleaning. Here the brick, laid in 1912, raised a full 5 in. above the rail and temporarily precluded the use of the track for car service.

All of the brick paving illustrated was of practically the same construction and showed that either cement



FROST-HEAVED BRICK PAVEMENT WITH BRICK REMOVED TO PERMIT TRAFFIC TO PASS—ANOTHER VIEW OF THE SAME PAVEMENT SHOWING FORCING OUT OR PULVERIZING OF PAVING MATERIAL



MORE ILLUSTRATIONS OF DAMAGE TO BRICK PAVEMENT. IN ONE CASE REMOVAL OF BRICK WAS NECESSARY. IN THE OTHER THE HEAVE WAS 5 IN.

grout or small brick fillers had been used between the track and the paving material, but that the fillers had in all cases broken up so as to cease to fulfill their function.

The heave in a wood-block pavement is shown in the picture below. This pavement was laid in 1909 and sustains a fairly heavy downtown traffic. It is laid on a 3.93 per cent grade with a 60-ft. roadway. The photograph does not indicate graphically the actual extent of the damage caused by the heaving. This pavement showed a greater height of heave than any of the brick or asphalt pavements examined, the heave measuring from 3 in. to 3½ in. The heaving appeared, generally, in the center of the car tracks and at no point on the outside of the tracks was any noticeable heave caused by frost action.

As in the case of the brick paving the wood-block paving did not have a close bond to the rail, a chamfered block next the rail being used with no filler. This allowed the formation of an ice filler between the block and the rail. That it was the expansion of the ice formed between the rail and the block that caused the heaving of the material was later demonstrated when wood blocks, frozen in the laboratory, showed an actual contraction in size in the freezing tests. It was noted that each rail joint, where the opportunity for the admission of water and snow was made easier by reason of the larger opening, that the heaving was greatest at these points. These blocks are of creosoted Douglas fir, 3¾ in. x 3½ in. x 6 in., and were laid upon a sand and cement cushion which was found to have held its place much better than the sand cushion in the portion of streets outside the tracks, which had been laid without mixing with cement.

All of the heaving described was due to the lack of proper drainage, which allowed the water to stand

against the rail till it became frozen, or to the lack of proper fillers between the material and the rail, which allowed the snow and ice to become driven into the space by the action of the car wheel and other vehicles and there to expand when the temperature lowered.

In all cases, in four different cities, the paving affected was in and around car tracks which were laid with T-rail. Both brick and wood block laid against girder rail, which permitted a close bond and did not allow the formation of ice against the tracks, showed no heaving as the result of the low temperatures.

The investigations described were made and reported upon by J. Thomas Dovey, president Seattle Engineering Company.

## Power Station Extension Completed at Lowellville, Ohio

The work of installing a 15,000-kw., 60-cycle, 2300-volt General Electric turbo-generator in the Lowellville power house of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, which was briefly described in the *ELECTRIC RAILWAY JOURNAL* of Nov. 20, 1915, has virtually been completed.

The addition to the generating station is housed in a 74-ft. extension on the east end of the older building, the arrangement of boiler and turbine rooms, electrical galleries and floors conforming to the layout of the original station. The entire building now covers an area 163 ft. in width and 175 ft. in length.

The generator is of the revolving-field type with motor or turbine-driven exciter. Clean air for cooling the coils is drawn through a duct containing water sprays. Attached to the turbo-generator is a Worthington surface condenser with 35,000 ft. of cooling surface. Water which is drawn from the Mahoning River through a new intake well and tunnel is circulated by a double suction volute pump, capable of delivering 27,000 gal. per minute.

The boiler-room equipment consists of five 600-hp. Babcock & Wilcox boilers, equipped with Foster superheaters and Taylor underfeed stokers. The boilers are supplied with feed water by a steam-driven centrifugal pump, having a capacity of 1000 gal. per minute. An engine-driven fan having a capacity of 60,000 cu. ft. per minute has been installed. An outdoor transformer and switching station with lightning arrestors located on the roof is being erected south of the new building.

The increased capacity of this plant was required by the demand for electric power in quantities by the large industries of the Mahoning and Shenango Valleys. The work on this installation was done by the Stone & Webster Engineering Corporation.



FROST-HEAVED WOOD-BLOCK PAVING



## LONDON LETTER

Incorporated Municipal Electrical Association to Meet in  
June—Some War-Time Tramway Results  
(From Our Regular Correspondent)

The twenty-first annual meeting of the Incorporated Municipal Electrical Association will be held in London on June 22 and 23 at the Institution of Electrical Engineers. On June 22, after the presidential address by A. C. Cramb, borough electrical engineer of Croydon, the following papers will be read: "Boiler-House Design," by W. W. Lackie, engineer and manager of the Glasgow Corporation Electricity Department; "Area of Supply from an Economic Standpoint," by H. S. Ellis, borough electrical engineer of South Shields; "The Application of Electrical Power to Agriculture," by W. T. Kerr, city electrical engineer of Hereford. The business meeting will be held on June 23.

A report of the tramways committee of the Newcastle Corporation presented at a recent meeting of the City Council states that the sum of £15,142 has been expended in excess of the sum of £81,700 named in the Newcastle-upon-Tyne Corporation Act, 1911, and recommends that application be made to the Board of Trade for sanction to borrow that amount. The expenditures were £4,094 for construction of tramways, and £11,048 for street works. The committee also reports that £10,789 was expended under the Newcastle-upon-Tyne Corporation (Tramways) Order of 1913, in construction and for equipment of the tramways. It recommends that application be made to the Board of Trade for sanction to borrow this sum also.

Statistics issued respecting the working of the Leeds City Tramways during the year ended March 31 last show that the total receipts were £41,150 in excess of those for the year 1914-15. This is equal to an increase of 9½ per cent. The total number of miles covered by the service decreased 117,616 miles, or 1.23 per cent. This is attributed to the fact that so many drivers and conductors joined the fighting forces the department was unable to utilize to the full the stock of cars at its disposal. In spite of the decline in mileage, the number of passengers carried increased more than 8 per cent. The receipts per car mile increased 1.187d. or 10.84 per cent.

Mr. Spencer, the general manager of the Bradford Corporation Tramways, reports that the total receipts for the past year were £334,315, an increase over the previous year of £14,921, or 4.7 per cent. The car mileage amounted to 6,199,601, a decrease of 172,109, or 2.75 per cent, compared with the previous year. So with a decrease in car mileage, due to a shortage of men and of stock, there was an increase in receipts of 4.7 per cent. Notwithstanding the many men who have joined the forces, the number of passengers carried, 74,000,000, exceeded that of the previous year by 4,000,000. Mr. Spencer says that the tramway department is now utilizing the services of six volunteers for driving cars on Saturdays and week-ends. The department has lost about 500 men through enlistment and transfer to Government work.

A number of matters relating to the tramway system were dealt with at a recent protracted sitting of the tramways committee of Edinburgh Town Council. The report considered dealt with the negotiations with the tramway company, and stated it was important to keep in view that, apart from all questions as to the best system of traction, the cable system must continue until June, 1919. The committee found that questions might arise with the company as to whether the Corporation would take over the company's cars at the end of the lease, and as to the extent of the obligation of the company in regard to the renewal of the tramway track and other parts of the tramway system. The whole of the tramway undertaking belonged to the Corporation, but the rolling stock was provided by and belonged to the company. The Corporation, however, was not under any obligation to take over the rolling stock from the company at the end of the lease. An expert instructed by the committee to inspect the cars and submit a valuation reported that in his opinion the Council would be justified in paying the company £25,000 for the 209 cars with the spare equipment at the termination of the lease. The directors of the tramway company would not accept less than £75,000. The committee regarded that as putting

an end to its negotiations. With regard to the renewal of the tramway track, the company declined to enter into any agreement on this point unless an agreement was also arrived at on the question of taking over its cars. As a result this point also remained unsettled.

At the ordinary general meeting of the London & Suburban Traction Company, Ltd., the chairman said that the absence of any dividend on the ordinary stock this time brought home to the security holders the fact that in 1915 the country was at war during the whole year. This brought him to the subject of the effect of the war upon their fortunes. Theirs was not an operating enterprise, but a holding company, and its fortunes and prosperity depended on the operating companies whose stocks it held. In the first place, the year had seen a tremendous increase in the prices of materials and the cost of labor. Coal by rail had gone up by 13 per cent, while sea-borne coal had gone up 34 per cent; timber had gone up 50 per cent, glass 90 per cent, copper 50 per cent, wood blocks 31 per cent, and steel tires 20 per cent. All the subsidiary companies were interested in some of those commodities and some were interested in all. In some cases prices were still rising. Owing to railway congestion arising from Government requirements the companies had to put up with irregular deliveries at enhanced prices. Besides the increased cost of labor, the operating companies had to contend with depletion in the numbers of their men. The places temporarily vacated by those who joined the colors had been filled, so far as possible, by the employment of men above military age or otherwise ineligible for war, and recourse had also been had to female labor.

About 300 women have been trained to act as conductors by the London General Omnibus Company. As many as 1000 women are to be put in training for current needs, but as more than 1400 male conductors are liable to be called up for military service in the later married groups, it is probable that the above number will be largely exceeded.

A strike occurred early in April among the drivers and conductors of the South Metropolitan Tramway system running from Croydon to Sutton, Tooting, Penge, and the Crystal Palace. The women employees were in sympathy with the men, and those who are members of the men's union struck with their male colleagues. The particular grievance which precipitated the strike is said to have been the taking out of two women for instruction as drivers. A resolution was passed by the men refusing to return to work until such time as they were ordered by the union to do so. One of the demands of the men was that all women who learned to drive must be withdrawn indefinitely. It is understood that the two women who were taken out on cars and shown how to drive were on trial at the request of the Board of Trade, in order that a report might be made on their fitness for the occupation of driving. At the time this letter was written a limited service was being maintained on some of the routes with the assistance of the available members of the indoor staff.

A majority of the drivers and conductors of the Croydon Corporation Tramways came out in sympathy with the employees of the South Metropolitan Tramway and decided not to return until certain demands with regard to wages, hours, etc., have been conceded. The main line of the Croydon Corporation system runs between Purley and Norbury, where it links up with the Streatham line of the London County Council, and travelers by this route are being put to great inconvenience in getting to their work in town, the competing omnibus and railway services being much congested. It is stated that compliance with the men's demands would involve the Corporation in the payment of about £10,000 a year. The Board of Trade has intervened in the tramway strike, but while the South Metropolitan Tramway has agreed to submit the points at issue to arbitration, the Croydon Corporation has refused. A limited number of cars are still running on the Corporation's system, and it is hoped to supplement the present small staff with what additional labor may be obtained and to add to the number of cars running until normal service has been established.

A. C. S.

[This letter usually appears in the first issue of the month. Its appearance this week instead of last week is due to delay in transmission incident to the war.—Eds.]

# NEWS OF ELECTRIC RAILWAYS

## CITY LINE ATTEMPTS CONSTRUCTION

### Legal Issues Stated Between United Railroads and San Francisco Municipal Railways

The Board of Supervisors of San Francisco, Cal., has directed the board of works to complete without delay the municipal street car line on Church Street and has also initiated proceedings for the construction on Market Street of lines from Twin Peaks tunnel to Kearny Street. This was indicated in the *ELECTRIC RAILWAY JOURNAL* of May 6, page 873, as the probable course of action.

When the Contra Costa Construction Company, which holds the contract for building the Church Street extension, was preparing to cut the United Railroads' line for the installation of the necessary crossing at Eighteenth and Church Streets it was denied permission to commence this work by United Railroads' officials. In replying to an inquiry from city officials, the United Railroads answered that since the city was preparing to force its way over company tracks, the legal department of the corporation had advised the refusal of permission for such construction.

The Church Street line has already crossed the United Railroads' tracks at Twenty-ninth and Twenty-fourth Streets at both of which crossings the corporation paid half of the expense, although as a matter of law, the cost of such crossings, as well as their maintenance, can be thrust entirely upon the new line. Precedent for this has already been established before the Railroad Commission of California.

Jesse W. Lilienthal, president of the United Railroads, has stated the case of the company in the *United Railroads Magazine* for May. He says in part:

"The threat of the city officials to smother our tracks on Market Street by building outer tracks on each side is attempted to be justified by the refusal of the company to exchange transfers with the city at Church and Market Streets on an equal basis, and by the refusal of the company to permit the use of its tracks on Market Street between Church Street and Van Ness Avenue except for a fair rental. So far as the latter proposition is concerned, your president expressly offered to the public utilities committee of the Board of Supervisors to permit the use of these tracks by the city for a consideration representing the exact loss to the company resulting from permitting such use. It is impossible to propose anything that would be fairer to both sides.

"So far as the exchange of transfers at Church and Market Streets is concerned, you will bear in mind that the privilege that would then be granted to the holder of a city transfer would give the right to ride a much longer distance than would be given to the holder of a company transfer riding on the Church Street line. The company was asked, with reference to this proposed exchange of transfers, to submit a proposition to the public utilities committee, and did so, by which the company offered to make the exchange on the basis of 3 cents to the company and 2 cents to the city. This, considering the difference in the length of the haul, was so favorable to the city that our honest and fair-minded city engineer made an official recommendation that the proposition be accepted as an eminently fair one. So that when our proposition was rejected and resolutions were thereupon introduced and recommended to the Board of Supervisors for adoption, looking to paralleling our tracks in Market Street, I do not need to express my own opinion as to the injustice of that action, but need only quote the opinion of that one of the city's own officials who is most competent, because of his learning and experience, to come to a just conclusion. It should also be borne in mind that by the very terms of our proposition the city would have received the right to terminate the arrangement if the city officials should at any time deem it advisable to do so.

"When this matter is properly understood by the people

of San Francisco, in whose ultimate verdict (once they understand the facts) I have utmost confidence, I know that they will not stand for confiscation of the company's property, purchased in reliance upon the good faith of San Francisco. And I ask every one of you to help me in bringing to our fellow citizens a correct understanding of the facts that have led to the present crisis."

## STRIKE IN SCHENECTADY

The motormen and conductors in the employ of the Schenectady (N. Y.) Railway decided at 2 a. m. on May 6 not to take out their cars on the day's run starting between 4 a. m. and 5 a. m. This decision by the employees was taken in an effort to require the company to meet a demand for a flat increase in wages of 5 cents an hour and followed the refusal of the men to accept the wage agreement reached by the New York State Railways with the electric railway employees in Oneida, Utica, Syracuse and Rochester. In each of these cities the wage offer, mentioned in the *ELECTRIC RAILWAY JOURNAL* of May 6, page 874, included an agreement covering three years. The Schenectady Railway offered an increase of 2 cents an hour to be in effect for the next two years and an additional 1-cent increase for the third year.

Thirty-six hours after the calling of the strike a settlement was effected following a conference at the office of Mayor Lunn, at which the strikers and the company officials agreed to arbitrate the dispute over wages and the duration of the agreement. The arbitration agreement provides that the board of arbitration shall be composed of three members, the company to select one, the representatives of the men one, and these two arbitrators to select a third. If the two arbitrators so chosen cannot select a third arbitrator within ten days from the date of their first meeting, the officials of the company and the committee of the association representing the men are to meet with the two arbitrators for the purpose of selecting the third arbitrator. Each side is to select its arbitrator within five days counting from the signing of the agreement. The decision of the majority of the board of arbitration is to be final and binding upon both parties to the agreement. Each side is to pay the expense of its own arbitrator, and each side is to bear half of the expense and services of the third arbitrator, together with any other expenses incurred in the arbitration. If any of the three arbitrators is unable to act the party making the original selection is to make another. Only the questions of wages and length of the agreement are to be submitted to the board of arbitration. No attempt was made to operate the cars during the time that the employees were out on strike.

In a statement which he issued to the public, James F. Hamilton, general manager of the company, said that he regretted very much the inconvenience to which the public had been put by the strike. He said that the settlement was satisfactory to the company, as it had stood for arbitration from the beginning of the controversy.

## COUNCIL DELAYS ACTION ON CLEVELAND WAGES

The City Council of Cleveland, Ohio, has voted to delay action on the measure approving additional expenditures by the Cleveland Railway to cover the increase in the wages of the motormen and conductors agreed upon on May 4. The company estimates that it will be necessary to increase the allowance for operating expenses nine mills per car-mile to produce the sum needed for additional wages. In considering the matter the Council divided almost completely on political lines. The opponents of the measure intended to approve the expenditure were with one exception Democrats while those who favored it were all Republicans. Most of the arguments against the measure were based upon a fear that 3-cent fares would be imperiled by the increase. During the discussions, however, it was hinted that since Mayor Harry L. Davis took the credit for bring-

ing about the settlement the administration should guarantee the city against any increase in fare. Mayor Davis is of opposite political faith from the majority in the Council. The vote on the matter stood seventeen for delay and nine against.

Fielder Sanders, street railway commissioner, recommended the passage of the measure at once and declared that he considered the settlement with the men a fair one. He said that in only two or three of the larger cities of the country are motormen and conductors paid less than the local men will receive under the new scale. He expressed the opinion that with the present increase in business activities the additional funds for the payment of wages will not necessitate a raise in the fare, although very careful management may be necessary.

Mayor Davis told the Council that it made no difference to him where the credit for the settlement is placed and that the administration will take the responsibility for the increase in the rate of fare, if it is ever necessary to make the change. He said that the administration acted for the good of the public. He referred Councilman Damm's remarks regarding a pre-election understanding with the street car men to Secretary Rea of the local branch of the Amalgamated Association. Mr. Rea denied that there had ever been a hint of such an understanding. He said, however, that the 3-cent fare should not be maintained at the expense of the street railway men.

#### NEW YORK CENTRAL IMPROVEMENT HEARINGS

Further arguments for and against the proposed plan of the port and terminal committee for improving Riverside Park and relocating the tracks of the New York Central Railroad were heard May 10 by the Board of Estimate of New York City. Charles W. Stoughton, president of the Municipal Art Commission, discussed the plan from the artistic side and advocated that whatever structure or buildings might be necessary in the proposed changes be placed in the control of his commission. At the conclusion of the hearing Controller Prendergast moved that the report, together with the record of the hearings, be referred back to the port and terminal committee. This was done with the understanding that there would be further hearings, if necessary.

Mayor Mitchel on the same day sent to Governor Whitman with his disapproval the two bills passed by the recent Legislature relating to the removal of the tracks of the New York Central Railroad from Eleventh Avenue at grade. One bill refers to the tracks as a public nuisance and the other seeks to protect the people of the city from the "injurious effect of smoke, odors, and noise" by having the road equipped with electricity. Regarding the first bill the Mayor pointed out that, if the Legislature had seen fit to pass it in 1911 or even last year, the city might well have accepted it as the means to the negotiation of a satisfactory settlement with the New York Central, but the situation was changed this year, the Mayor stated, as a settlement with the railroad company had been negotiated by the port and terminal committee of the Board of Estimate.

#### PHILADELPHIA TRANSIT ELECTION ON MAY 16

At the primaries in Philadelphia, Pa., on May 16 the voters will be called upon to pass on the transit loan of \$57,100,000 approved by the City Councils on April 11. The transit matter now to be passed on has been before the people about five years. The plans for transit improvements drawn under the direction of A. Merritt Taylor, director of city transit during the Blankenburg administration, were adopted and \$6,000,000 was made available for preliminary work under those plans. Then came a change in the city administration and the reopening of the whole transit matter through suggestions which were made for the modification of the system as originally proposed. The discussion which has followed has grown both acrimonious and bitter. Mr. Taylor has returned to the fray to conduct the campaign in behalf of the program of construction laid down by him. In an appeal to the public which he made on May 9 Mr. Taylor said:

"Three millions have been appropriated for the construction of the Broad Street subway and \$2,000,000 worth of

that work has already been placed under contract. You must remember that if the transit loan bill should be defeated it cannot be brought up again at the November election, or within one year of May 16.

"By voting for the transit loan you will enable the city to proceed with the construction of the high-speed lines. The city will then either be able to conclude the tentative agreement with the existing street railways or secure an independent company to equip and operate the city-owned high-speed system."

#### \$500,000 TO BE SPENT IN ELECTRIFYING SALT LAKE LINE

Brief mention was made in the *ELECTRIC RAILWAY JOURNAL* of May 6, page 874, of the announcement by Joseph Nelson, general manager of the Salt Lake & Los Angeles Railway, to the effect that arrangements had been perfected for the electrification of the line, which operates from Salt Lake City to Saltair Beach, which is approximately 15 miles west of the city, and that the company will extend its line from Saltair to Garfield, a distance of 3 miles. Ties, rails and the other equipment necessary for this extension have already been ordered.

Preliminary work on the electrification of the main line to Saltair has been begun. At the half-way passing point an additional mile of passing track has been built. When the road is electrified it will at first be operated as a single-track line with long double-track turnouts at passing points, but these passing points will gradually be extended until the entire line has been double tracked.

Mr. Nelson has announced that arrangements have been completed with C. F. Childs & Company, Chicago, Ill., to finance the Garfield extension and the electrification of the line. H. A. Strauss, consulting engineer, with offices in the Harris Trust Building, Chicago, has been engaged to prepare plans and specifications for the electrification. Mr. Strauss will visit Salt Lake within the next thirty days to study the local problems connected with the work. The plans that are made will depend to a considerable extent upon the arrangements which the Salt Lake & Los Angeles Railway is able to effect with the Utah Light & Traction Company, which operates the local line in Salt Lake City.

The electrification of the line will involve the purchase of new rolling stock, as the present trailers, used with steam locomotives, would not be adapted to electric operation. Mr. Nelson states that it is proposed to use all-steel cars of the latest design for this new equipment. The cost of the proposed improvement will exceed \$500,000.

**I. C. C. Bill Ordered Favorably Reported.**—Senator Newlands' bill increasing the membership of the Interstate Commerce Commission from seven to nine and dividing the members into three groups to expedite their work has been ordered favorably reported to the Senate by the Interstate Commerce Commission.

**Change in Bay State Organization.**—The office of superintendent of equipment of the Bay State Street Railway, Boston, Mass., has been abolished, and E. W. Holst has been appointed mechanical engineer of the company and Howard W. Irwin has been appointed superintendent of car repairs.

**Strike of "Sand Hogs" Settled.**—Through the efforts of Chairman Oscar S. Straus of the Public Service Commission for the First District of New York the strike of the "sand hogs" employed in the Old Slip-Clark Street and Whitehall-Montague Street tunnels under the East River, which began on April 5 last, has ended and the men, some 800 in number, have returned to work.

**Agreement on Pittsburgh Terms of Service.**—The terms of service of the employees of the Pittsburgh (Pa.) Railways other than those of wages, referred to in the *ELECTRIC RAILWAY JOURNAL* of May 6, have been adjusted. The final meeting on these matters was held on May 5. The most important change from the working terms as they existed previously was an increase from \$1.40 a day to \$1.65 a day in the guaranteed minimum for extras.

**Borough Park Subway and Elevated Extension to Begin Operation.**—June 2 has been tentatively set as the date to begin operation of the Borough Park section of the

Fourth Avenue subway and the elevated extension from Thirty-eighth Street to Sixty-second Street along New Utrecht Avenue. This line will be operated as part of the Brooklyn (N. Y.) Rapid Transit System.

**Cincinnati Franchise Discussed.**—The proposed revision of the franchise of the Cincinnati (Ohio) Traction Company was discussed before the street railways committee of the Cincinnati Council on May 3. Secretary Culkins suggested that the company would probably be willing to surrender its old franchise, which has thirty years to run, for a modern indeterminate grant that would include the lease of the rapid transit loop which is to be built by the city.

**Hearing on Proposed Order Covering Reports on Physical Property.**—The Public Service Commission for the First District of New York has set May 22 as the date for a public hearing, at which representatives of the railroad and rapid transit companies operating in New York will be heard upon the subject of an order the commission proposes to issue requiring these corporations each year to certify to the condition of the structures on the various lines that are operated by them.

**Buffalo Employees Vote on Company Wage Offer.**—An agreement has been reached between the officials of the International Railway, Buffalo, N. Y., and the motormen and conductors on the city and interurban lines of the company on practically every point at issue with the exception of the wage scale. The company has offered these employees an increase of 2 cents an hour, but after a vote of the union taken on May 10, it was announced that this offer had been rejected. Another special meeting of the employees will be held. It is expected that the wage scale will be arbitrated.

**Electrified Terminals Predicted for Chicago.**—John F. Wallace, chairman of the Railway Terminals Commission of Chicago, stated recently that it was his belief that the Chicago & Northwestern Railway and the trackage in the new union station now under construction would be electrified within a short time. Mr. Wallace is quoted as saying: "Electrification will be necessary by reason of the constantly increasing business. The Pennsylvania Railroad found at its New York terminal that by electrification as much business could be done on four tracks as on sixteen by steam."

**Baseball News from Philadelphia.**—The first issue of "Diamond News," official publication of the Philadelphia (Pa.) Rapid Transit Baseball League, is dated May 1. It indicates a very interesting and lively season in the contest for the championship cup, which will become the permanent property of the winning team. Hamilton watches will be awarded to the leading pitcher, the leading batsman and the player scoring the greatest number of runs. The player submitting the best baseball essay and the non-contestants submitting the two best essays will also receive Hamilton watches.

**Action Taken Against Railway in Repair Case.**—On motion of Commissioner Henry W. Hodge, the Public Service Commission for the First District of New York has sent a letter to District Attorney Swann of New York County, calling his attention to the failure of the Third Avenue Railway and the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway to obey the commission's order of May 21, 1915, requiring these companies to make certain repairs to their tracks. This action was taken under Sec. 58 of the public service commissions law, which makes violation of an order of the commission a misdemeanor.

**Bulletin of the National Tax Association.**—The National Tax Association has begun the publication of an official bulletin to be issued nine times during each year, *i. e.*, each month except July, August and September. It is intended for circulation among the members and others to keep them advised on topics of current interest and to serve as a medium for the intercommunication of ideas and suggestions. The subscription price to members is included in the annual dues, while to non-members it is \$2 a year. Orders and inquiries should be addressed to A. E. Holcomb, treasurer, 15 Dey Street, New York, N. Y.

**Superintendent Gaboury Praised.**—At the recent Good Roads Congress in Montreal, Quebec, Chief Engineer Mercier of that city read a paper on "Snow Removal in Mon-

treau." He said that the average snow fall for forty-nine years had been 119 in., and there was snow on seventy-nine days in 1915, with rain on twenty-eight of these days. Mr. Mercier described the methods by which the city and the Montreal Tramways co-operated to clear the streets, and referred to the organization under A. Gaboury, superintendent of the railway, as "wonderful." The cost of cleaning sidewalks was 7½ cents per running foot, and clearing the roads cost \$2,500 per mile.

**Tentative Rules for Overhead Electrical Construction in Illinois.**—The State Public Utilities Commission of Illinois has issued a bulletin covering tentative rules for overhead electrical construction which have been drawn up for discussion at a hearing to be held in the offices of the commission at Springfield, Ill., on May 16. The rules cover the following general classifications: overhead construction in general, construction at crossing between wires, construction at crossings of wires over railroad tracks, crossings of wires under railroad structures, construction for jointly used pole lines and general recommendations for construction and operation of supply systems and signal systems whose lines are involved in parallels.

**Strike on Dorchester Tunnel.**—About 500 Italian laborers employed in the construction of the Dorchester tunnel at Boston, Mass., went on strike early last week. No work was done on Monday night, May 8, under Fort Point Channel. At the office of Patrick McGovern, a contractor for the section latest affected by the walk-out, it was stated that the men are being paid \$3 and \$3.50 a day, an advance of 50 cents over the day rate of a few months ago. This is a higher rate than has ever before been paid for excavation labor in Boston subway work. Strikes were settled on May 9 on sections of the tunnel being built by Coleman Brothers and the T. A. Gillespie Company, Boston. It is understood that no increase in pay was granted.

**Massachusetts Wages Conferences.**—Negotiations as to wages are under way in Massachusetts on the Worcester Consolidated Street Railway and the Springfield Street Railway and on the Boston Elevated Railway. Although the details of the agreements under discussion between the managements and the employees are not as yet public, it is understood that they involve substantial advances affecting about 2000 men on the Worcester and Springfield properties. On the Boston system conferences have been proceeding practically every day for the past four or five weeks and it is hoped that an agreement may be reached without the necessity for arbitration proceedings. Press accounts state that the employees of the Worcester and the Springfield companies rejected proposals by the company for certain changes in the working agreement early in the week ended May 13 and that further conferences will be conducted.

**Norfolk Franchise Before Aldermen.**—The report of the joint committee of the Council of Norfolk, Va., which has been considering the matter of new franchises to be granted to the Virginia Railway & Power Company, was presented to the Board of Aldermen on May 9. That body concurred with the Common Council in postponing consideration of the franchises until a meeting of a committee of the whole Council, but set no date for the meeting. Citizens of what is known as Berkley Ward held a mass meeting the same night and passed resolutions to be presented to the Councils opposing the passage of the ordinances in their present shape. Their principal objection to the measures is the proposed abrogation of the 2½-cent labor ticket now in force between Norfolk proper and the portion of the city in which they live. They also want 80-cent gas. E. C. Hathaway, assistant general manager, appeared before the citizens and explained some matters in connection with transfer privileges and other features of the ordinance which they did not understand.

**Baseball League at Baltimore.**—The United Railways & Electric Company, Baltimore, Md., has formed a baseball league consisting of sixteen teams, the various nines being composed of employees of closely affiliated lines in order that the spirit of route rivalry which has been an interesting feature of the bowling contest will continue to be maintained. The company has provided playing space on its property at Carroll Park, and will supply the players with uniforms and all other equipment. One man has been

employed to manage the league and devote all his time to the details. The company will provide a pennant and also a loving cup for the winning club. The second annual bowling tournament of the company terminated on April 13. The winning team received custody of a silver loving cup, to remain in its possession for one year and to become the permanent property of the team which wins it three times. The members of the winning team received gold medals and the individuals making the highest score, the highest single score and the highest number of strikes were presented with gold watches.

**Three-Year Agreement Negotiated in Albany.**—Negotiations between the officers of the United Traction Company, Albany, N. Y., and the representatives of the Albany and Troy branches of the Amalgamated Association terminated on May 8 in an agreement for three years, effective from July 1. The new contract virtually is identical with the one now in operation, with the exception of the wage scale. After July 1 motormen and conductors will receive 30 cents an hour instead of 28 cents. Wages of all other employees will be increased in similar ratio. All men now employed will receive the raise, irrespective of the length of their employment. The agreement provides, however, that new employees shall receive 28 cents an hour. This will be increased 1 cent at the end of six months and another cent at the end of twelve months, so that new men employed after July 1 will not receive the 30 cents an hour until they have been employed one year. Sections of the agreement covering working conditions are changed only slightly from the present agreement. In the draft submitted by the men the section on wages called for an increase of 5 cents an hour. The company responded by offering 2 cents, and after a vote the men decided to accept the company's offer.

**Thompson Committee Hearings Continued.**—On May 9 the Thompson legislative committee delved into the unsuccessful negotiations of several years ago between the Interborough Rapid Transit Company and the Longacre Power Company to have the transit company sell its surplus current to the Longacre concern. DeLancey Nicoll, of counsel for the Interborough Company, was called as a witness. He stated that in his opinion the life of the Thompson committee ended with the adjournment of the Legislature. Samuel Untermeyer, counsel for the Longacre Company, and Frank Hedley, vice-president and general manager, and H. G. Stott, chief engineer of the Interborough Rapid Transit Company, were also questioned. Contractor John F. Stevens was asked about his negotiations with T. P. Shonts, president of the Interborough Rapid Transit Company, for the contract for third-tracking the elevated lines. On May 10 E. J. Berwind, a director of the Interborough Rapid Transit Company, was questioned regarding the proposed Stevens contract and matters relating thereto. Bridge Commissioner F. J. H. Kracke testified in regard to the proposed removal of the Brooklyn Bridge extension across Park Row to City Hall Park. He said that the structure would be removed as soon as the connection between the Center Street Loop and the Brooklyn Bridge was put into operation. On May 11 T. A. Gillespie of the T. A. Gillespie Company, which obtained the contract for third-tracking the elevated lines in Manhattan, was the principal witness before the committee.

#### PROGRAM OF ASSOCIATION MEETING

##### Railway Signal Association

A stated meeting of the Railway Signal Association will be held at the Hotel Astor, New York, N. Y., on May 24 and 25. The meeting will open at 10 a. m. on May 24 with reports from committees on signaling practice, mechanical interlocking, direct-current automatic block signaling, and electrical testing. There will also be a discussion on analytical methods of solving track circuit problems. On May 25 there will be reports from committees on power interlocking, standard designs, wires and cables, and on the harmonizing of specifications. It is expected that this session will be completed by 4 p. m. The association is planning a dinner and theater party for members attending the meeting, and it is requested that all delegates register promptly upon arrival at the association headquarters on May 24, so that the arrangements for the entertainment may be concluded.

## Financial and Corporate

### ANNUAL REPORTS

#### Chicago Surface Lines

A comparative statement of revenues and expenses of the Chicago (Ill.) Surface Lines for the twelve months ended Jan. 31, 1915 and 1916, follows:

	1915	Per Cent	1914	Per Cent
Gross earnings .....	\$31,690,761	100.00	\$31,966,048	100.00
Expenses:				
Maintenance of way and structures .....	\$973,086	3.07	\$931,407	2.91
Maintenance of equipment .....	1,677,570	5.29	1,533,155	4.80
Renewals .....	2,535,260	8.00	2,557,283	8.00
Traffic expenses .....	41,011	0.13	2,110	0.01
Operation of power plants .....	2,779,717	8.77	2,781,906	8.70
Operation of cars—				
Trainmen .....	8,162,239	25.76	7,596,036	23.76
Other .....	1,214,071	3.83	1,190,486	3.73
General expenses—				
Damages .....	1,054,982	3.33	1,198,726	3.75
Other .....	758,479	2.39	658,881	2.06
Expenses of Board of Supervising Engineers .....	112,307	0.36	86,205	0.27
Taxes .....	1,732,629	5.47	1,353,073	4.23
Total expenses.....	\$21,041,356	66.40	\$19,889,275	62.22
Residue receipts .....	\$10,649,405	33.60	\$12,076,773	37.78
Divided:				
Chicago Railways 59 per cent .....	6,283,149	....	7,125,296	....
South Side Lines 41 per cent .....	4,366,256	....	4,951,476	....

Detailed figures in regard to the subdivisions of gross earnings for the surface lines and in regard to the separate financial showing of the Chicago Railways and the South Side Lines were published from reports for these two divisions in the ELECTRIC RAILWAY JOURNAL of March 25 and April 15. The foregoing statement, however, is taken from the very complete second annual report of the Chicago Surface Lines to the board of operation. The greater part of the increase in operating expenses, amounting to \$1,152,080, was caused by the wage increase which became effective on June 1, 1915. The effect of this increase will be approximately \$950,000 for the first year of the contract and \$1,250,000 for the second year. The balance of the increase was due to larger expenditures for maintenance of track, roadway and equipment and for taxes. The increase in equipment maintenance was more marked than that for way and structures. The total amount expended for maintenance of way and structures showed an increase of \$45,162, whereas the expenditures for maintenance of equipment rose \$144,415.

During the first year of unification the board of operation authorized \$250,000 of the maintenance fund to be used in putting cars through the shops for painting and general overhauling, to be expended 60 per cent on cars belonging to the Chicago Railways and 40 per cent on cars belonging to the South Side Lines. Of this appropriation \$236,658 was spent during the year. In 1915 \$300,000 was appropriated to be expended in the same way. Of this amount \$282,400 was expended, making the total expended during the two years \$519,058, of which \$313,117 or a trifle more than 60 per cent was expended on equipment belonging to the Chicago Railways, and \$205,941 or a trifle less than 40 per cent was expended on equipment belonging to the South Side Lines.

During the year the Chicago Surface Lines made a contract with the Galena Signal Oil Company covering the lubrication of rolling stock equipment for five years on a mileage basis. The contract is said to have effected a material reduction in cost. Owing to the use of 34-in. wheels and improved shop methods the lines are getting better mileage out of the steel wheels. The average mileage per wheel for 1914 was 87,195 miles, while for the year just ended the average increased to 94,862 miles.

The lines have reached an agreement with the health department of the city with reference to the heating and

ventilating of all of the cars not equipped with a mechanical system of ventilation, whereby additional heating capacity is to be installed, together with thermostatic control and a natural system of ventilation. Plans have been prepared and approved by the health department, and requests for bids for the necessary apparatus have been issued. This work will be pushed forward as rapidly as possible. The result of adjusting these questions is that, during the year, no suits were brought against the companies with reference to heating or ventilation of cars.

The city purchase price of all the properties as of Jan. 31, 1916, was \$148,221,578. During the last fiscal year the companies expended for new capital requirements the sum of \$2,972,413. Extensions totaling 22.34 miles were built, and 1.81 miles were abandoned, giving a net addition of 20.53 miles and a total single-track mileage of 1023.03. Two new substations, 4000-kw. and 8000-kw. capacity, were completed and put into operation. The power (a.c.) purchased from the Commonwealth Edison Company for the year, amounted to 498,152,705 kw.-hr. at a cost of \$3,634,198. The total d.c. output at the substations and power houses was 465,139,489 kw.-hr. at a total cost, including maintenance, fixed charges, purchased power, etc., of \$3,908,018.

The report of the companies describes in interesting detail the organization and work of the various departments, such as the transportation, purchasing, legal, claims, accounting and treasury departments, and also discusses various topics arising in Chicago operation, as the sustained validity of the unification ordinance and the pending questions of car renewals, State *versus* city regulation, and unification of the surface electric railways and the elevated electric railways.

In connection with the work of the purchasing department it is noted that there were 2371 requisitions for material, supplies, equipment, etc., received during the year, aggregating a total of 19,600 items. These requisitions required the placing of 13,000 purchase orders and 29,300 invoices were checked and recorded on these orders. Contracts made in the early part of the year for requirements of standard materials and supplies of various classifications enabled the companies to secure low prices, prompt placing of orders and prompt delivery. These contracts were of further benefit, inasmuch as a shortage of raw material and increased demand for practically all materials and supplies caused a steady increase in prices throughout the year.

All scrap and obsolete material, supplies and equipment accumulated or becoming obsolete during the year were sold in the usual way, *i.e.*, notices were sent to all available dealers in this class of material, and the material was sold to the highest bidder. All bids for the sale of scrap and obsolete material were submitted to and approved by the Board of Supervising Engineers. There were 169 contracts closed during the year covering the sale of scrap and obsolete material, supplies and equipment. The amount of scrap sold was divided as follows: Scrap iron and steel, 16,000 gross tons; scrap metals (such as copper, brass, etc.), 800 net tons. The prices obtained for scrap, particularly for metals, were much higher than those ever before obtained. In fact, in some instances, the metals were sold at a price which amounted to more than their original cost.

Under unified operation the claims investigated totaled 16,770 in the last fiscal year as compared to 14,358 in 1914, and the claims settled were 6967 and 7448 respectively. As compared to 1914, the accidents reported in 1915 showed a decrease of more than 14 per cent, with an increase of 16 per cent in the claims investigated. The Chicago Surface Lines reserve account for damages showed a balance on Jan. 31, 1916, of \$1,047,017 as compared to \$581,520 a year before.

The total passenger receipts for the year amounted to \$31,086,715, making an average daily receipt of \$85,169. The largest daily receipts during 1915 were on Dec. 24, 1915, amounting to \$106,126. The average number of employees during the year was approximately 12,000. The total amount disbursed for payrolls during the year was \$12,671,794. The average payroll per month amounted to \$1,055,982.

### North American Company

The comparative statement of income and undivided profits of the North American Company, New York, N. Y., for the calendar year 1915 follows:

	1915	1914
Interest received or accrued.....	\$488,804	\$610,145
Dividends received .....	1,438,028	1,503,801
Profits and compensation for services.....	28,671	42,377
<b>Total .....</b>	<b>\$1,952,503</b>	<b>\$2,156,323</b>
Salaries, legal expenses, net rentals and all other expenses of administration.....	\$77,780	\$77,630
Taxes .....	10,576	24,397
Interest paid or accrued.....	25,821	140,173
Sundry accounts written off and reserves..	33,550	5,351
<b>Total .....</b>	<b>\$147,727</b>	<b>\$247,551</b>
<b>Net income .....</b>	<b>\$1,804,776</b>	<b>\$1,908,772</b>
Dividends paid and accrued during year.	1,489,665	1,489,665
<b>Balance carried to undivided profits account</b>	<b>\$315,111</b>	<b>\$419,107</b>

The foregoing table shows the lessened income from dividends and interest in 1915, about half of which was met by the decrease in expenses, so that the net income suffered a loss of \$103,996. The Wisconsin group of companies controlled by the North American Company includes The Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company, and the holding company also controls the United Railways of St. Louis. The showing of these companies is briefly reviewed below:

The operating revenues of The Milwaukee Railway & Light Company for 1915 amounted to \$5,971,715, a decrease of \$33,780, or 0.56 per cent, as compared with the previous year. Operating expenses, including taxes and reserves, decreased \$67,543, or 1.60 per cent, while gross income decreased \$2,722, or 0.15 per cent, and interest charges decreased \$29,804, or 3.62 per cent, so that the net income increased \$27,082, or 2.67 per cent. The operating revenues of the electric light and power department increased \$164,995, or 8.71 per cent, while the operating revenues of the railway department decreased \$198,775, or 4.83 per cent. This decrease was due to the industrial depression and the operation of jitneys in competition with the street railway lines. The expenditures for construction during the year amounted to \$484,782, of which the following are the principal items: (1) Construction of 1.028 miles of additional track; (2) paving in track zone; (3) extensions to underground distribution system; (4) installation of additional mains and services.

The operating revenues of the Milwaukee Light, Heat & Traction Company for the year amounted to \$1,480,625, a decrease of \$13,042, or 0.87 per cent, as compared with the previous year. Operating expenses, however, including taxes and reserves, increased \$44,615, or 4.72 per cent. Gross income decreased \$57,564, or 4.62 per cent; interest charges increased \$17,589, or 2.73 per cent, and net income decreased \$75,153, or 12.50 per cent. The operating revenues of the electric light and power department increased \$64,240, or 11.62 per cent, while the operating revenues of the railway department decreased \$77,282, or 8.21 per cent. This decrease was due to the industrial depression and diverting of riding to automobiles. The expenditures for construction during the year amounted to \$380,095, of which the following are the principal items: (1) Completion of installation of turbo-generator and boilers in Racine power plant; (2) installation of 750-kw. motor-generator set in Racine power plant; (3) extensions to electric distribution system in the various districts served; (4) paving and cost of heavier railway track laid upon reconstruction.

The operating revenues of the United Railways of St. Louis for 1915 totaled \$11,681,200, a decrease of \$769,724, or 6.18 per cent. Operating expenses, including taxes and reserves, decreased \$486,340, or 5.17 per cent. Gross income decreased \$272,800, or 8.73 per cent, with interest charges less by \$30,287, or 1.16 per cent, so that the net income decreased \$242,513, or 47.73 per cent. During the year the expenditures for construction amounted to \$53,540, of which the following are the principal items: (1) Construction of 0.52 mile of track; (2) construction of permanent pavement in track zone; (3) additional passenger car equipment. The expenditures for construction work during the year, charged to depreciation reserve, amounted to \$763,757, consisting

principally of the replacement of 27.53 miles of track, retying and reballasting of 10.47 miles of unpaved track, remodelling of twenty-seven cars and rebuilding of 273 cars. The North American Company receives no dividends on the common stock of this subsidiary owned by it.

#### READJUSTMENT OF UNITED RAILROADS FINANCES PROPOSED

Jesse W. Lilienthal, president of the United Railroads, San Francisco, Cal., was quoted in the San Francisco *Examiner* recently as discussing plans for the readjustment of the securities of the company referred to in the *ELECTRIC RAILWAY JOURNAL* of April 1, page 668. He is quoted in part as follows:

"I have been at work for a long time on a plan of reorganization of the company's securities looking to place them on a basis that will be absolutely conservative. When every detail of the plan has been worked out I shall wish to submit it to the Railroad Commission before making it public through other channels, but I see no objection to stating that in working out the plan I have had in mind three fundamental considerations:

"1. Reducing the bonded indebtedness of the company to a point under the value of the actual physical properties.

"2. Providing new securities for the holders of the present ones, which on the basis of present earnings, and in no way discounting the future growth of the city, will make an annual return at least as large as is now being paid.

"3. Providing a market for the new securities through an underwriting syndicate which will give to the present holder of securities, if he elects to sell instead of holding, a price substantially larger than the one that he could now realize by disposing of his existing securities."

#### CONSOLIDATION PROPOSED IN NEW ORLEANS

##### Stockholders to Vote on May 22 on Consolidation of New Orleans Railway & Light Company and Its Subsidiaries

It is proposed to consolidate the subsidiary companies with the New Orleans Railway & Light Company, New Orleans, La., into a company which will own directly all street railways now owned by the subsidiary companies. The plan for the consolidation has been approved by the directors of all the companies involved, and meetings of the stockholders of the several companies have been called for May 22 to ratify the plan.

The New Orleans City Railroad, the New Orleans & Carrollton Railroad, Light & Power Company, the Orleans Railroad, the St. Charles Street Railroad, the New Orleans & Pontchartrain Railway and the New Orleans Railway & Light Company own all the street railroads in New Orleans. The New Orleans Railway & Light Company operates the New Orleans City Railroad under a lease which runs until 1955, and in addition owns all but a comparatively few shares of the stock of that company and of all the other companies mentioned.

In order to obtain the large sums of money necessary to develop the railways in New Orleans, the New Orleans Railway & Light Company has had to use its own credit, as it was shown to be impracticable for the various companies to continue to borrow on their individual credit. To obtain these funds the New Orleans Railway & Light Company has, from time to time, issued and disposed of its own obligations on the credit of the stock of the subsidiary companies. This method of financing has proved cumbersome and costly, and, in addition, a large expense is needlessly incurred annually through the necessity of keeping up the legal organization and the overhead expenses and salaries of the several subsidiary companies. It is on account of these conditions that the consolidation is proposed.

The New Orleans Railway & Light Company has authorized and issued \$10,000,000 par value of 5 per cent non-cumulative preferred stock and \$20,000,000 of common stock. The property owned by the company consists in the main of all but a comparatively few shares of the capital stocks of the subsidiary companies and of the New Orleans Gas Light Company. The consolidation of the subsidiary companies with the New Orleans Railway & Light Company will be

effected under the statutes of the State of Louisiana. The company resulting from the consolidation will own all of the physical properties of the New Orleans Railway & Light Company and of the subsidiary companies and the shares of stock of the New Orleans Gas Light Company now owned by the New Orleans Railway & Light Company, as for legal reasons the gas company cannot be a party to the consolidation. The consolidated company will be called the New Orleans Railway & Light Company, and will have the same stock capitalization as the existing New Orleans Railway & Light Company, to wit: 100,000 shares, of the par value of \$100 each, of 5 per cent non-cumulative preferred stock, and 200,000 shares of common stock of the par value of \$100 each.

The stock capitalization of the consolidated company, which will be the same as that of the present New Orleans Railway & Light Company, will be less than the sum total of the stock capitalization of the New Orleans Railway & Light Company, plus the outstanding stocks of the subsidiary companies not owned by the New Orleans Railway & Light Company. The shares of stock necessary to effect this reduction have been provided through an arrangement between the American Cities Company, which is the owner of a large part of the preferred and common stock of the old New Orleans Railway & Light Company, and the consolidated company.

#### AUBURN & SYRACUSE READJUSTMENT

##### New Note Financing with Common Stock Bonus Has Been Completed—List of New Management

The readjustment of the finances of the Auburn & Syracuse Electric Railroad, Syracuse, N. Y., has been carried out in accordance with the terms of the letter addressed to the stockholders of the company on Jan. 26. On Feb. 1, 1916, there came due \$250,000 of one-year notes issued by the company. There also had to be paid at that time six months' interest at 5 per cent on these notes, amounting to \$6,250. On Aug. 1 \$115,000 of eighteen-month notes issued by the company are to mature. In the circular of Jan. 26 the company said that at that time \$72,000 in cash was required by the company to provide for outstanding short-time paper, past due vouchers, accounts payable and accrued interest.

In order to provide for these requirements, the directors outlined a plan of financial readjustment which called for the issuance of \$437,000 face value of five-year 6-per cent coupon notes to be dated Feb. 1, 1916, the total note issue under the trust agreement to be limited to \$450,000. Common stock of the company was to be delivered as a bonus with the five-year notes at the rate of one share of stock with every \$100 of notes. It was provided that this common stock bonus should be obtained from the holders of common stock. As the total outstanding issue of common stock was 12,500 shares substantially 35 per cent of the entire issue was required to furnish the 4370 shares needed for the bonus, and in order to distribute this requirement equally among all the common stockholders, every holder of common stock was called upon to furnish 35 per cent of the common stock held by him. The common stock to be delivered with the five-year notes was to be in the form of voting trust certificates and an additional amount of the stock was to be deposited under the voting trust so as to give the voting trustees a majority of all of the outstanding capital stock of the company. Stockholders were privileged to subscribe to the notes at par and accrued interest. The voting trustees were to be Hendrick S. Holden and Arthur W. Loasby, Syracuse, and F. W. Roebing, Jr., Trenton, N. J. The voting trust was to continue for a period of five years.

The \$437,000 of five-year notes issued to provide for the maturing notes and other obligations mentioned previously were to be applied as follows: \$250,000 to the payment of \$250,000 of one-year notes maturing on Feb. 1, 1916; \$115,000 to the payment of \$115,000 of outstanding eighteen-month notes; \$72,000 to furnish \$72,000 of cash to pay short-time paper, past due vouchers, accounts payable and accrued interest; the remaining \$13,000 of the five-year notes were to be used as the directors might determine.

On April 4 the Public Service Commission for the Second District of New York authorized the issue of the \$437,000

of five-year 6 per cent gold notes referred to in the plan and also approved the proposed trust agreement under which the notes were to be issued. A sufficient amount of common stock was turned in to the treasurer of the company to enable the proposed voting trust to be established and the stock was turned over to Messrs. Holden, Loasby and Roebing as voting trustees. It is announced now that the notes have been disposed of and that they have been applied as set forth in the plans.

The new officers and directors of the company are as follows: Harold G. Metcalf, Auburn, N. Y., president; Hendrick S. Holden, Syracuse, N. Y., vice-president; T. C. Cherry, Auburn, N. Y., vice-president and general manager; W. A. Holden, Syracuse, N. Y., treasurer; S. C. Rogers, Syracuse, N. Y., assistant treasurer; H. C. Beatty, Syracuse, N. Y., secretary; C. Loomis Allen, A. H. Cowie, Hendrick S. Holden, W. A. Holden, Arthur W. Loasby, H. G. Metcalf, William O. Morgan, William Nottingham and F. W. Roebing, Jr., directors.

#### OUTLINE OF CHICAGO & MILWAUKEE REORGANIZATION PLAN

It is reported that the reorganization of the Chicago & Milwaukee Electric Railroad, Highwood, Ill., sold under foreclosure on May 1, as noted in the *ELECTRIC RAILWAY JOURNAL* of May 6, page 878, will very likely be carried out in accordance with the plan and agreement dated Jan. 20, 1912. This called for the deposit of the two classes of bonds with either the Chicago Title & Trust Company or the National Trust Company, Toronto. It provided for the formation of a new company, to be organized under the laws of Illinois or Wisconsin, or both, to take over the properties of the Wisconsin company, the Illinois company and the Wisconsin company holding the property in the city of Milwaukee, from and through the protective committee. Three new mortgages were to be created; one, a first mortgage to cover all property held at that time or afterward acquired, not to exceed \$10,000,000 or 5 per cent rate of interest; a second mortgage securing first income bonds, not to exceed \$4,500,000, non-cumulative 4 per cent per annum, interest payable out of net earnings only; a third mortgage, securing second income bonds not to exceed \$6,000,000, non-cumulative 4 per cent per annum, interest payable out of net earnings only after the annual interest on the second mortgage income bonds had been paid in full. The capital stock was to amount to \$6,000,000, all of which was to be turned over to the committee to be disposed of as they saw fit. The sale remains to be confirmed by the Circuit Court in both States.

**American Cities Company, New York, N. Y.**—The directors of American Cities Company have voted to retire on July 1 at par and interest by lot \$2,500,000 of the 5-6 per cent eight-year collateral trust bonds, due on July 1, 1919. The remaining \$7,500,000 of these bonds will continue outstanding on a 5 per cent basis until July 1, 1917, after which time they will bear interest to maturity at the rate of 6 per cent.

**Cities Service Company, New York, N. Y.**—It is understood that Cities Service Company will soon call for payment the entire issue of \$7,000,000 of 7 per cent five-year notes due on March 15, 1918. The notes will be paid at 102 and interest any time between June 12 and July 12, interest ceasing after July 12. Funds for the retirement of the notes were secured from the proceeds of the sale of \$14,000,000 of bonds of the Empire Gas & Fuel Company, a subsidiary. The notes were originally issued to acquire and develop natural gas and oil properties now included in the Empire Gas & Fuel Company.

**Fargo & Moorehead Street Railway, Fargo, N. D.**—On July 2 the Fargo & Moorehead Street Railway will pay, through the Northwestern Trust Company, St. Paul, all the outstanding 6 per cent second mortgage bonds of the corporation. The redemption will be made at 105 and interest. This is in accordance with the terms of the new financing of the Northern States Power Company, referred to in the *ELECTRIC RAILWAY JOURNAL* of May 6, page 877.

**Gary & Interurban Railroad, Gary, Ind.**—Judge Anderson in the Federal Court has authorized the issuance of

\$39,000 of receivers' certificates by the Gary & Interurban Railroad.

**Kansas City, Clay County & St. Joseph Railway, Kansas City, Mo.**—The Supreme Court of Missouri has denied the motions of attorneys for the Kansas City, Clay County & St. Joseph Railway to require Judge Bird of the County Circuit Court to dismiss the receivership under which the company is operating, and prohibit the judge from exercising jurisdiction over the receivers or the property in their custody. The receivers were appointed following the judgment in the circuit court for \$1,500,000 in favor of the Interstate Railway.

**Mexico (Mex.) Tramways.**—A protective committee consisting of E. R. Peacock, S. C. Boulter, H. F. Chamen, Robert Fleming, Arthur Hill, H. Malcom Hubbard and A. F. B. Roger has issued a letter asking for the deposit of bonds of the Mexico Tramways, the Mexico Light & Power Company, Ltd., the Mexican Electric Light Company, Ltd., and the Pechuca Light & Power Company. This action is taken because of the difficulties encountered from the unsettled conditions in Mexico. American bondholders may deposit with the Canadian Bank of Commerce in Toronto.

**San Francisco-Oakland Terminal Railways, Oakland, Cal.**—The San Francisco-Oakland Terminal Railways has filed with the California Railroad Commission an application for authority to issue promissory notes for \$180,000 at 6 per cent, callable at 100½ and interest, on sixty days' notice, and maturing between 1917 and 1925. The company expects to use the money from these notes with \$54,000 more for twenty steel cars costing \$6,000 each, of the pay-as-you-enter type, and twelve cars costing \$9,500 each in express service between Oakland and Berkeley. Contracts for the purchase of the first twenty cars are being negotiated. The twelve cars last mentioned will be built in the Oakland shops of the railways or bought elsewhere. Preliminary estimates show that the cars can be constructed in the Oakland shops for \$9,500 each. Arrangements have been completed for the sale and disposition of the notes at par, with accrued interest. The notes are to be secured by a car trust agreement. The \$54,000 needed above the \$180,000 to be secured from the notes will be obtained by the payment by the company of \$200 a day to its trustees under the car trust agreement, beginning on May 1, 1916, and continuing until fully paid. Of the notes \$10,000 will be due on May 1, 1917, and \$10,000 on Nov. 1, 1917. Similar sums will be due on the same dates in succeeding years until 1925.

**Seattle, Renton & Southern Railway, Seattle, Wash.**—On May 1 Scott Calhoun, one of the receivers of the Seattle, Renton & Southern Railway, offered the line for sale, acting under orders of Judge A. W. Frater of the King County Superior Court. No bids were received, and a new date at which time the property will be again offered for sale will be set in the near future. John C. Higgins, counsel for Peabody, Houghteling & Company, Chicago, Ill., and other bondholders, announced that no bid could be made by his clients, because in the time allowed by the court they had been unable to perfect their arrangements in accordance with the provisions of the reorganization plan approved by Judge Frater on April 1. The terms of the plan for the reorganization were reviewed in the *ELECTRIC RAILWAY JOURNAL* of April 15, page 752.

**Southern Wisconsin Railway, Madison, Wis.**—The Southern Wisconsin Railway has filed for record papers certifying to a change in the name of the company to the Madison Railways.

**Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.**—The Terre Haute Traction & Light Company, operated under lease by the Terre Haute, Indianapolis & Eastern Traction Company, has asked for tenders, through the State Street Trust Company, until May 22, of sufficient of its first consolidated 5 per cent bonds to exhaust \$33,048 now available for the sinking fund.

**Toronto (Ont.) Railway.**—The Toronto Railway has called a special meeting of the stockholders for May 29 to approve an increase in its capital stock from \$12,000,000 to \$15,000,000. Part or all of the new stock will be offered to stockholders at par, the proceeds to be used for corporate purposes of the company.



# Traffic and Transportation

## BAY STATE CROSS-EXAMINATION CONTINUED

### Proceedings in Fare Case Still Center About Valuation Expert

The Massachusetts Public Service Commission has continued on alternate days the hearings in the Bay State Street Railway fare case. The proceedings still center about the cross-examination of R. M. Feustel, expert witness of the company in valuation matters. Mr. Feustel stated that the expenses of the company arising from personal injuries had been apportioned in the valuation report by operative routes, on the basis of the total number of passengers hauled, as it was not considered fair to debit any route or section, as an average cost to that section, with the particular injuries caused in that section for any one year.

In regard to changes in the length of fare zones, the witness said that in general where two contiguous zones had been redivided, it had usually been done on through routes by shortening the first zone from the center of the city and increasing the one beyond. In some cases transfer privileges were shortened; in others the adjustment had been made in more than the immediate adjacent zone. As a rule the addition of a zone came naturally into the division of the longest zones that were in existence. Only a few passengers in proportion to the total volume of traffic would be obliged to pay a 12-cent fare for a journey now requiring 5 cents. About \$1,000,000 in old power plant equipment on the south of Boston was credited at its scrap value in the report of the engineers headed by Mr. Feustel and about \$250,000 in antiquated rolling stock. The witness said that the Milwaukee Electric Railway & Light Company, Kansas City, Clay County & St. Joseph Railway and Manchester Traction, Light & Power Company were basing their depreciation charges upon the composite property life theory.

The witness said that the average condition of the property might be expressed as 75 per cent of normal and that renewals had not been sufficiently looked out for in the past. The company had not earned enough to enable its operating condition to be expressed at 100 per cent efficiency. The company would have to provide for more depreciation in the future if it was going to be in operating condition. Although some of the early single-truck cars of the road lasted for thirty years, twenty years was beyond the time when modern roads were discarding them. In Cleveland cars were being discarded after only fifteen years service. The witness held that although turbo-generators represent an improvement over reciprocating engines, the former would last a shorter time than the latter, partly on account of depreciation and partly because of obsolescence. Emphasis was laid upon the replacement of vertical turbo-generators built only ten or twelve years ago by improved horizontal prime movers. Commissioner Eastman said that if an old open car lasts thirty years a modern semi-convertible car ought not to wear out in twenty years, but Mr. Feustel stated that the open cars showing the longer life operated relatively few car-miles compared with the service expected of double-truck semi-convertible cars. The former were continuous eight-hour cars, operating in the summer. Practically all the open cars represented a fractional year equipment, which meant a different life situation than applied to the semi-convertible type of car.

An exhibit was filed at the hearing of May 8 showing that the gross earnings necessary to meet the present operating expenses and provide for depreciation and a 7 per cent return on the revised investment value as determined for the Massachusetts property was \$10,661,966. This represented \$1,569,889 more yearly revenue than the representative year ending June 30, 1914, supplied; that is an increase of 18.20 per cent in passenger revenue was necessary. In this estimate the value of land included in the total investment had been changed from the present market value to the actual cost, a reduction of \$648,502. This gave as the investment value of the Massachusetts property, \$41,563,308,

**United Light & Railways Company, Grand Rapids, Mich.**  
—Announcement has been made of the sale by United Light & Railways Company to N. W. Halsey & Company and Russell Brewster & Company of \$1,000,000 of first and re-funding 5 per cent bonds, making \$8,451,000 of this issue outstanding. The proceeds of the bonds just sold will be used to reimburse the treasury of the company for cost of improvements and betterments to properties of subsidiary companies.

### DIVIDENDS DECLARED

Brooklyn (N. Y.) City Railroad Company, quarterly, 2 per cent.

Kentucky Securities Corporation, Lexington, Ky., quarterly, 1½ per cent, preferred.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., quarterly, 1½ per cent, preferred.

Monongahela Valley Traction Company, Fairmont, W. Va., 1 per cent, common.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1¼ per cent, common.

Philadelphia Company, Pittsburgh, Pa., quarterly, 87½ cents, common.

Public Service Investment Company, Boston, Mass., quarterly, \$1.50, preferred.

### ELECTRIC RAILWAY MONTHLY EARNINGS

#### BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

Period	Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Mar., '16	\$72,293	*\$66,603	\$5,690	\$22,304	†\$16,380
1 " " '15	68,846	*63,015	5,831	17,230	†11,269
9 " " '16	711,143	*594,675	116,468	173,821	†153,706
9 " " '15	725,301	*654,114	71,187	155,160	†82,563

#### LEWISTON, AUGUSTA & WATERVILLE STREET RAILWAY, LEWISTON, ME.

1m., Mar., '16	\$55,204	*\$45,072	\$10,132	\$16,155	†\$6,023
1 " " '15	53,132	*35,603	17,529	15,663	1,866
12 " " '16	747,892	*490,819	257,073	191,224	65,849
12 " " '15	691,967	*461,458	230,509	187,048	43,461

#### NASHVILLE RAILWAY & LIGHT COMPANY, NASHVILLE, TENN.

1m., Mar., '16	\$194,038	*\$121,775	\$72,263	\$42,807	\$29,456
1 " " '15	175,946	*108,397	67,549	41,964	25,585
12 " " '16	2,189,901	*1,349,511	840,390	513,680	326,710
12 " " '15	2,226,710	*1,307,423	919,287	490,464	428,823

#### NEW YORK & STAMFORD RAILWAY COMPANY, PORT CHESTER, N. Y.

1m., Mar., '16	\$24,955	*\$22,691	\$2,264	\$7,979	†\$5,678
1 " " '15	24,051	*23,915	135	7,975	†7,810
9 " " '16	281,730	*227,699	54,031	71,959	†17,458
9 " " '15	283,059	*232,703	50,356	71,084	†120,378

#### NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

1m., Mar., '16	\$39,834	*\$46,537	†\$6,702	\$5,997	†\$10,986
1 " " '15	36,135	*45,048	†8,913	\$6,259	†13,639
7 " " '16	375,154	*425,508	†50,354	\$5,171	†93,802
9 " " '15	328,952	*392,400	†63,447	\$7,617	†106,299

#### PORTLAND RAILWAY, LIGHT & POWER COMPANY, PORTLAND, ORE.

1m., Mar., '16	\$450,803	*\$254,205	\$196,598	\$182,064	\$14,534
1 " " '15	445,544	*266,308	179,236	183,854	†4,618
12 " " '16	5,453,357	*3,063,650	2,389,707	2,204,581	185,126
12 " " '15	5,978,042	*3,221,351	2,756,691	2,196,100	560,591

#### REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO

1m., Mar., '16	\$330,046	*\$195,084	\$134,962	\$67,862	\$67,395
1 " " '15	242,236	*158,298	83,938	55,244	28,697
3 " " '16	958,821	*556,477	402,343	201,365	201,920
3 " " '15	724,837	*459,347	265,489	165,888	99,867

#### RHODE ISLAND COMPANY, PROVIDENCE, R. I.

1m., Mar., '16	\$451,308	*\$355,741	\$95,567	\$118,373	†\$21,828
1 " " '15	372,155	*311,891	60,264	117,308	†56,213
9 " " '16	4,046,643	*3,089,387	957,256	1,042,426	†120,834
9 " " '15	3,913,994	*2,978,147	935,847	1,061,947	†159,065

#### WESTCHESTER STREET RAILROAD COMPANY, WHITE PLAINS, N. Y.

1m., Mar., '16	\$17,997	*\$18,657	†\$660	\$1,748	†\$2,383
1 " " '15	18,408	*22,664	†4,256	1,449	†15,697
9 " " '16	186,361	*190,950	†4,589	15,037	†19,366
9 " " '15	193,687	*203,695	†10,008	11,719	†21,630

\*Includes taxes. †Deficit. †Includes non-operating income. ‡Excludes interest on bonds, charged against income and paid by the New York, New Haven & Hartford Railroad under guarantee; also interest on notes held by the New York, New Haven & Hartford Railroad Company, not credited to income of that company.

and the working capital assignable to Massachusetts property was \$1,424,097, making the total \$42,987,405. The revenue requirements for the Massachusetts property were: Variable expenses, \$5,993,505 (composed of maintenance of way and structures, \$783,906; maintenance of equipment, \$768,887; traffic, \$58,353; conducting transportation, \$3,381,835; general and miscellaneous, \$1,000,524); taxes \$604,957; amount needed for depreciation in addition to present maintenance charges, \$1,054,386; interest on \$42,987,405 at 7 per cent, \$3,009,118; total revenue needed, \$10,661,966.

Mr. Feustel's exhibit showed that it was estimated that the revenue on the Massachusetts lines of the company north of Boston would be increased 13.61 per cent by the proposed tariff, and that the lines south of Boston would show an increased revenue of 15.89 per cent, or an average of 14.43 per cent for the Massachusetts system. The estimated increase in revenue was \$753,962 on the northern and \$490,127 on the southern lines, or a total increase of \$1,244,089. This was \$382,699 less than was required. In studying the apportionment of revenue and deficits by routes Mr. Feustel found that out of fifty-six operative routes north of Boston, fifty-two showed a deficit judged by the 1914 average standard of income, and that of thirty-nine routes south of Boston, thirty-six showed a deficit.

#### COMPARATIVE ACCIDENT FIGURES FOR FIVE YEARS

*The Electrogram*, published by the Puget Sound Traction, Light & Power Company, Seattle, Wash., contained in its issue for April 6 the following record of all accidents on the lines of the company involving damages or injury:

	1911	1912	1913	1914	1915
Collisions between cars.....	22	15	15	21	9
Collisions with vehicles.....	363	424	537	515	849
Collisions with pedestrians.....	176	149	136	116	89
Deraillments.....	25	9	8	5	10
Defective car or track.....	79	21	56	28	18
Boarding moving cars.....	114	32	49	38	11
Leaving moving cars.....	209	125	110	106	46
Boarding and leaving still cars.....	172	151	172	184	150
Persons while on cars.....	361	351	384	427	821
Miscellaneous.....	257	76	83	84	60

In commenting on these figures the company said:

"The reduction in accidents by 'collisions with pedestrians,' and to 'persons while on cars,' shows that the public is co-operating with us in the safety work, and that our employees are watchful and careful. Most of the accidents to people while on the cars are of a minor character, such as are caused by a sudden stop while a passenger is just leaving a seat, or a child falling down in the aisle. The apparently large number of these is simply due to the fact that our conductors make a record of even trivial happenings."

#### DECISION RENDERED IN HUNTINGTON FREIGHT CASE

The Long Island Railroad in October, 1915, decided definitely to discontinue freight deliveries by electric railway to Huntington. Before actually taking the step, however, it caused a canvass to be made for the purpose of ascertaining local sentiment on the subject. No serious objection was then raised to the plan, but later the Public Service Commission for the Second District of New York was asked to issue an order directing the Long Island Railroad forthwith to re-establish its freight service to Huntington village by trolley, at the old rates. Notwithstanding the Long Island Railroad's ownership of a majority of the capital stock of the Huntington Railroad it appeared to the commission that it was dealing not primarily with a steam railroad which had well recognized obligations to the public in respect to freight transportation, but with a street railroad organized primarily as a passenger carrier, whose duties in respect to freight transportation were at least of a secondary and subordinate character. The commission felt that it would be an improper exercise of power on its part to grant the relief which the complainants asked. The commission said:

"For the commission to order a trolley line which is now losing money in its regular passenger business, to continue to carry freight at a loss, under such conditions as appear in the present case, would be to carry the principle of state

regulation of street railroad corporations further than the present public service commission law intends that it shall be carried. The fact that a steam railroad happens at some given moment to own or control a majority of the capital stock of a trolley line, as to which such a question as is here involved arises, does not of itself alter the situation, or establish any material change in the obligations under which trolley lines, by whomsoever owned, stand toward the public in respect to freight transportation."

#### PENNSYLVANIA FIXES STATUS OF JITNEYS

A general ruling governing all auto-bus lines or jitneys in the State was issued on May 9 by the Public Service Commission of Pennsylvania. In part it is as follows:

Certificates of public convenience evidencing the approval of the commission will be "limited to the route and number of cars, and particularly to each automobile or auto-bus designated in the certificate."

Application may be made for the approval of additional cars, including substitutions and replacements, verified by affidavit; but certificates will be non-transferable.

Automobiles or auto-buses authorized to be common carriers shall have painted on each side of the vehicle three lines, containing the name of the person to whom certificate is issued, the words "auto-bus" and the number of the public service certificate.

Persons holding certificates will not be allowed to carry more persons than the seating capacity of the designated car, and the filed rates and charges must be posted in each car. The commission reserves the right to revoke any certificate.

#### TRANSPORTATION DEVELOPMENTS IN CALIFORNIA

Within a single week recently three significant things occurred in the transportation field in California. The Southern Pacific Company announced that it would take off certain passenger trains because jitney competition was so keen that there was no longer any profit for the steam lines. Contracts for carrying mail were awarded to jitneys between southern California cities. An ordinary stock automobile was driven from Los Angeles to San Francisco, a distance of 484 miles by rail, in three hours less time than is made by the fastest steam train between these points.

The jitneys are now affecting interurban steam line traffic in almost as serious a way as they at first affected urban systems. In the case of the mail contract award the jitneys by their competition first made it so unprofitable for the steam lines that the latter cut the service down to one train a day. The residents in the outlying towns who depended on the steam lines for the mails protested against the reduction in service, and the Postmaster-General turned the contracts over to the jitney lines. As to the ten-hour-and-forty-seven-minute run from Los Angeles to San Francisco, the run was made by a stock car over a route that is, at best, devious and somewhat rough. The significant fact, however, is that autos have repeatedly made the trip in time better than the fastest trains have made the run.

**Toledo Rerouting Plan Defeated.**—The plan to take four of the eleven lines of the Toledo Railways & Light Company, Toledo, Ohio, from Summit Street and route them over Superior and St. Clair streets was defeated in the Toledo Council on May 8. This practically defeats the rerouting plan that was prepared by a special committee of Council. Summit Street merchants opposed the plan from the beginning.

**Inquiry Into Brooklyn Surface Equipment.**—An inquiry into the sufficiency of the equipment of the surface lines of the Brooklyn (N. Y.) Rapid Transit System will be held by the Public Service Commission for the First District on May 15, on motion of Commissioner Travis H. Whitney. The commission will determine as a result of the hearing whether an order should be issued requiring the company to purchase additional cars.

**Janitors Become Traffic Officers.**—Janitors of four schools of Louisville, Ky., have been named by the Board of Education and have applied to the city officials for authorization to act as traffic officers before and after school hours. Three

of the schools are located on much traveled street railway lines. The results of this manner of surveillance of the school children will be observed carefully during the remaining weeks of the school year. If the plan is deemed to be successful it will be carried out on a larger scale next year.

**"The Public Be Pleased."**—This is the title of an article by F. H. Sillick, comptroller of the Hudson & Manhattan Railroad, which appears in the May issue of *System*. Mr. Sillick emphasizes the value of training employees to be sincere, calm and courteous at all times. Among other things, he says: "Being square with your patrons is giving them efficient, courteous service and not 'public be pleased' cant. To gain the good-will of the public your attitude must be sincere. Three factors are essential to the successful management of any corporation—pleased capital, pleased labor and pleased patrons."

**Suit Against Bellingham Jitneys.**—The Puget Sound Traction, Light & Power Company has started suit against seventeen local jitney bus owners in Bellingham, Wash., alleging that the jitneys there are being operated in unlawful competition with the street railway system. An injunction is asked to enjoin the jitney service until such time as the operators see fit to comply with the city ordinance and the State law regulating jitney buses. The suit of the company follows closely a suit instituted by the jitney drivers to prevent the city ordinance from being enforced. This is now before the Supreme Court of the State.

**Opinion on Sanitation.**—According to an opinion written to the Public Service Commission of the State of Washington by Attorney General W. V. Tanner, as the result of an inquiry from the health department of the city of Spokane, a city of the first class may prevent the operation of street cars in a condition calculated to affect injuriously the health, safety or welfare of the inhabitants of the city. The Attorney General said: "If it can be established as a fact that a poorly ventilated car or a car not cleaned as provided in the city ordinance is a nuisance or is detrimental to the general health of the community, as distinguished from the convenience of the passengers, the city may properly prevent the use of such a car within the city limits."

**Effective Brooklyn Safety Poster.**—The Brooklyn (N. Y.) Rapid Transit Company has issued a number of very effective safety posters recently. One is entitled "More Haste—Less Speed." It gives a short account, from one of the Brooklyn papers, of an accident to a man who tried to board a moving car on Gates Avenue and then continues: "There are 1050 trips made by trolley cars on Gates Avenue between 7 o'clock in the morning and 7 o'clock in the evening. If this man had, without an accident, caught the car for which he was running, he would have saved, approximately 1¼ minutes. The chances are he will remain in the hospital for a week at least. During that time he will miss 7,350 Gates Avenue cars and perhaps be deprived of the use of his hand for a month. It is better to wait on the near side curb for the car we are going to get than to lie in the hospital and miss them all." This poster is being issued by the National Safety Council.

**Portland Jitney Ordinance Amended.**—The City Council of Portland, Ore., on April 26, passed the amendments to the original jitney ordinance. The changes have been pending for about two months. The jitneys are required to operate at least eight hours out of every twenty-four and to give continuous service during the eight hours. They may select any eight hours in twenty-four they desire. They are prohibited from stopping more than five minutes at either end of their route and except during the morning and evening rush hours are required to operate to each terminus of the route without turning back. The measure provides that the drivers may pay their licenses quarterly in advance instead of monthly in advance as at present. In case of a machine going out of business before the end of the quarter the city will refund the unearned part of the license. The city will not, however, make any refund of more than \$4 on the \$6 license for each quarter. Provision is made for tagging machines that are unsafe. An emergency clause was attached to the ordinance making its provisions enforceable at once.

## Personal Mention

Mr. C. A. Leonard has been made purchasing agent of the Tampa (Fla.) Electric Company.

Mr. C. L. Howe has been appointed electrical engineer of the Tampa (Fla.) Electric Company.

Mr. J. M. Eaton, formerly purchasing agent of the Tampa (Fla.) Electric Company, is now in the Boston office of Stone & Webster.

Mr. James Orr, formerly chief engineer of the Tampa (Fla.) Electric Company, has been transferred to the Dallas (Tex.) Electric Company.

Mr. E. J. Seabom, formerly assistant treasurer of the Pensacola (Fla.) Electric Company, is now assistant treasurer of the Tampa (Fla.) Electric Company.

Mr. Harold G. Metcalf, Auburn, N. Y., has been elected president of the Auburn & Syracuse Electric Railroad, Syracuse, N. Y., to succeed Clifford D. Beebe.

Mr. H. E. Harley, formerly chief engineer of the power station of the Jacksonville (Fla.) Traction Company, has been appointed chief engineer of the power station of the Tampa (Fla.) Electric Company.

Mr. C. Peterson, heretofore line foreman of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., has been appointed superintendent of the line department of the company, reporting to Mr. C. P. Cooper, superintendent.

Mr. J. C. Nelson has been appointed general manager of the Gary & Interurban Railroad, Gary, Ind., to succeed Mr. A. C. Miller. Mr. Nelson was graduated from the University of Alabama and from Cornell University and was with Ford, Bacon & Davis, New York, for twelve years.

Mr. A. Baltzer, heretofore master mechanic of the Windsor, Essex & Lake Shore Rapid Railway, Kingsville, Ont., has been appointed electrical engineer of the company in charge of power house and rolling stock. He succeeds the late W. W. Chisholm.

Mr. R. A. Moore has been appointed general manager of the Aurora, Plainfield & Joliet Interurban Railway, Joliet, Ill., to succeed Mr. F. C. Eckmann, who has resigned to give his entire attention to the affairs of the Joliet & Eastern Traction Company. Mr. Moore will assume his duties on June 1.

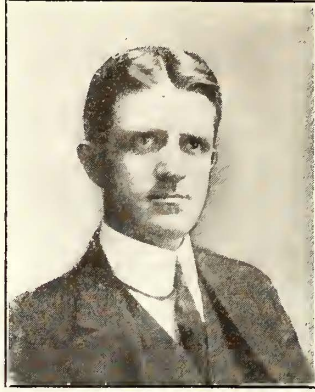
Mr. LeRoy T. Harkness has been transferred by the Public Service Commission for the First District of New York from the position of assistant counsel in the legal department of the commission and has been placed in administrative and executive charge of all rapid transit matters, responsible directly to the commission.

Mr. Louis H. Palmer has been appointed acting general manager of the Eastern Pennsylvania Railways, Pottsville, Pa., to succeed W. B. Rockwell, deceased. Mr. Palmer has been general superintendent of the company. His previous railway and business connections were reviewed in the *ELECTRIC RAILWAY JOURNAL* of April 8 in connection with his appointment to the company.

Mr. John T. Corrigan has been promoted to supervisor of the division of the Kansas City (Mo.) Railways having Fifty-eighth and Harrison Streets as headquarters, formerly filled by Mr. Julien Harvey, recently made efficiency superintendent. Mr. Corrigan is a son of the late Bernard Corrigan, formerly president of the Metropolitan Street Railway and other Kansas City companies.

Mr. F. C. Eckmann, joint general manager of the Aurora, Plainfield & Joliet Railway and of the Joliet & Eastern Traction Company for the last two years, will sever his connection with the former company on June 1 and will give his entire attention to the system between Joliet and Chicago Heights, with his headquarters, as heretofore, in Joliet, Ill. Before taking charge of these two roads in 1914 Mr. Eckmann was general manager of the Joliet & Southern Traction Company, by which name the entire system was known before the division.

Mr. W. V. Hill, who, as noted in the *ELECTRIC RAILWAY JOURNAL* for May 6, has been appointed manager of the California Electric Railway Association, was born in Raleigh, N. C., on Oct. 2, 1877. Mr. Hill was educated in private and public schools, and left the high school in Asheville, N. C., at the age of fifteen to go to work as a telegraph messenger under his father. Later he became manager of a branch office of the Postal Telegraph Company at Richmond, Va. He was promoted and sent to Georgetown, Ky., to open a new Postal office, and later was again promoted and sent to Paris, Ky. When he was nineteen years of age Mr. Hill was recalled to Richmond, Va., to relieve his father. He worked in the Richmond office for five years, resigning to go to New York. There he worked with the Western Union and the Associated Press jointly for about a year, when he resigned to accept a position as night manager of the Postal Company at Norfolk, Va. Six months later he returned to New York to work with the Western Union and the Associated Press. In 1901 Mr. Hill was recommended by the officials of the Western Union to the late E. H. Harriman to install and operate a private wire which Mr. Harriman leased, connecting directly with his vast railway interests. In addition to handling the telegraphic work he accompanied Mr. Harriman as traveling secretary on numerous trips over the country. Mr. Hill resigned his position under Mr. Harriman after eight years of service and accepted a position as assistant to the general manager of the Los Angeles Pacific Railway. Fourteen months later he was promoted to the position of right-of-way, land and tax agent of the company, and when the eight electric railways at Los Angeles were consolidated in 1911, Mr. Hill was appointed tax and contract agent of the Pacific Electric Railway System, affiliated land companies, Visalia Electric Railroad, Fresno Traction Company, Stockton Electric Railroad, San Jose Railroads and Peninsula Railway. He continued with these companies in the capacity mentioned until May 1, 1916, when he was appointed manager of the California Electric Railway Association.



W. V. HILL

Mr. Edward N. Lake, managing engineer of the Krehbiel Company, and assisting engineers have been engaged by the board of control of the Kansas City (Mo.) Railways to make tests and suggest improvements of service. Their inquiry will extend to high-tension generating stations, high-tension conductors, stations and substations, low-tension conductors, car distribution and passenger traffic.

Mr. J. M. Ahearn, assistant master mechanic of the Ottawa (Ont.) Electric Railway, has been appointed assistant superintendent of the company, in charge of equipment. Mr. Ahearn has worked in almost every capacity in street railway work up to his present position and is familiar with the different branches of the work. He spent several years in electric railway work in the Western States and was for some time located in San Diego.

Mr. F. A. Alspach has been appointed tax agent of the Pacific Electric Railway, Los Angeles, Cal., to succeed Mr. W. V. Hill, tax and contract agent, who as noted previously in the *ELECTRIC RAILWAY JOURNAL* has resigned to become manager of the California Electric Railway Association. Hereafter contract work will be undertaken by the departments directly interested. Franchise and insurance records will be maintained by the tax department of the company as heretofore.

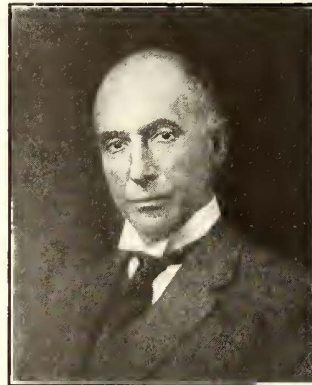
Mr. Milo R. Maltbie, former member of the Public Service Commission for the First District of New York, has been appointed by Mayor Mitchel of New York to be city chamberlain, succeeding Mr. Henry Bruère. The Mayor said that in inviting Mr. Maltbie to take the office he had had in mind securing for the city an expert and adviser in public

service matters. In addition to the regular work of the chamberlain's office, the Mayor hopes to have Mr. Maltbie give special and constant attention to public service matters that come before the city administration.

Mr. Charles Harper Batchelor has been appointed traffic manager of the Toronto (Ont.) Civic Railway. Mr. Batchelor was born at Bradford, England, on May 18, 1885. He entered electric railway service in August, 1907. From April 9, 1909, to April 1, 1913, he was a conductor and motorman with the Bradford City Tramways, and motorman on the trackless electric system at Bradford. From April 20 to June 1, 1913, he served as a motorman with the Toronto (Ont.) Railway. Later he acted as controller man for the Toronto & York Radial Railway. From August, 1913, to March, 1916, he was roadmaster of the Toronto Civic Railway.

Mr. D. I. Clough, who has been appointed master mechanic of the East St. Louis & Suburban Railway, East St. Louis, Ill., was engaged in general electric railway construction from April 1, 1903, until September, 1910. From September, 1910, to March, 1912, he was master mechanic of the Central California Traction Company, at Stockton. From March, 1912, to February, 1914, he was with the General Electric Company, at Portland, in railway construction. From March 1, 1914, until March 15, 1916, he was master mechanic of the Oregon Electric Railway and the United Railways, Portland. On Aug. 15, 1915, his jurisdiction was extended over the Spokane & Inland Empire Railroad, Spokane, Wash. Mr. Clough has been connected with the East St. Louis & Suburban Railway at East St. Louis since March 15.

Mr. Charles N. Black, vice-president and general manager of the United Railroads of San Francisco, will sever his connection with that company on June 1 and thereafter will devote



CHARLES N. BLACK

all of his time to the interests of the firm of Ford, Bacon & Davis, of which he is a member. In the announcement of his resignation he said that his only reason was because the business of the firm demands his presence in New York. Mr. Black is one of the best-known electric railway men in the country and has always been very active in association work, having been president of the American Electric Railway Association in 1913 and 1914 and a vice-president of the association from 1908 to 1913. Previous to 1907, when he went to San Francisco, he was vice-president and general manager of the Metropolitan Street Railway, Kansas City, Mo., as well as vice-president of the Kansas City Railway & Light Company and Kansas City Electric Light Company. He is a graduate of Princeton University in the Arts course, and after a post-graduate course in engineering in that university entered the employ of the Brush Electric Company and later went with the Westinghouse Electric & Manufacturing Company. He has been connected with Ford, Bacon & Davis since 1899. The San Francisco newspapers announce Mr. William von Phul, a member of the firm of Ford, Bacon & Davis, residing in New Orleans, as the probable successor of Mr. Black, but confirmation of this report could not be obtained. Mr. von Phul was formerly vice-president of the American Cities Company. As a member of the firm of Ford, Bacon & Davis, Mr. von Phul has followed closely the work of the United Railroads of San Francisco for the last ten years. He spent a year in that city after the fire, during which time he assisted in the reconstruction of the electric railway system and its conversion from cable power.

Mr. Charles A. Floyd, superintendent of the northwestern division of the Michigan Railway, Jackson, Mich., and formerly general manager of the Grand Rapids, Holland & Chicago Railway, Grand Rapids, Mich., has resigned, ef-

fective on June 1. He will after that date devote his entire time to the business of the Construction Supply Company, of which he is president. Mr. Floyd entered the electric railway business in 1901 in the offices of the Grand Rapids, Holland & Chicago Railway. Later he was made superintendent of the road, which was then a short suburban line connecting Holland and Macatawa Park, Mich. He held this position for two years, during which the road was extended to Grand Rapids. Mr. Floyd had charge of both its construction and operation. In 1904 he was also appointed purchasing agent and traffic manager of the company. In January, 1912, the Grand Rapids, Holland & Chicago Railway changed ownership and Mr. Floyd was made general manager. He held this position until the railway was made a part of the Michigan Railway System through the completion of the line between Kalamazoo and Grand Rapids, when he was appointed superintendent of the northwestern division.

#### OBITUARY

**Willard Parker Hough**, assistant structural engineer of the Brooklyn (N. Y.) Rapid Transit Company, and a member of the American Legion, died on May 8 from peritonitis. Mr. Hough was thirty-five years old.

**John W. Wyman**, manager of the "Sunshine department" of the Interborough Rapid Transit Company, New York, N. Y., who spent years visiting the sick employees of the company, died on April 19, in his seventy-fourth year.

**Charles E. Cook**, first president of the Acushnet (Mass.) Street Railway, died at his home in New Bedford, Mass., on April 23, at the age of eighty-two. He also was associated with the construction of the Dartmouth & Westport Street Railway.

**Enos M. Barton**, chairman of the board of directors of the Western Electric Company, New York, N. Y., died at Biloxi, Miss., on May 3, at the age of seventy-two. Mr. Barton was one of the founders of the Western Electric Company and served as its president for twenty years. Mr. Barton began work as a messenger in the telegraph office at Watertown, N. Y., when he was twelve years old. He was a telegraph operator in New York during the Civil War.

**George G. Whitney**, chief clerk of the Washington Railway & Electric Company, Washington, D. C., died on May 7 after a short illness, the immediate cause of death being diabetes. Mr. Whitney was a native of Nebraska, but had lived in Washington since he was three years old. He was educated in the grade schools of the National Capital, and upon graduation from the business high school entered the service of the Washington Railway & Electric Company, gradually working his way up through the clerical branches to the position of chief clerk, which he held for a number of years. Mr. Whitney was the first president of Company Section 4 of the American Electric Railway Association. He was also third vice-president of the American Electric Railway Accountants Association and a member of the board of governors of the Washington Railway Relief Association. Mr. Whitney was thirty-four years old. He is survived by his widow and three small children.

**Henry Floy**, electrical engineer and valuation expert, died suddenly at his residence in New York City on May 5. Mr. Floy was graduated from Cornell with the class of 1891, and during several years following graduation served with the Westinghouse company in its shop, engineering and sales departments. He resigned as manager of the Minneapolis office of the company in 1898 to open an office as consulting engineer in New York City, where he has since been located. Mr. Floy installed the first 25,000-volt underground transmission line at St. Paul, Minn., in 1900. Later he served in many important appraisal cases in New York City; Buffalo, N. Y.; Springfield, Mo.; Tucson, Ariz., etc. He was a frequent contributor to the technical press, and was the author of a number of volumes, including "The Colorado Springs Lighting Controversy," "High-Tension Underground Electric Cables," "Valuation of Public Utility Properties" and "Value for Rate Making." He was a member of the jury of awards at the St. Louis Exposition, a fellow of the American Institute of Engineers, and a member of the American Society of Civil Engineers, the National Electric Light Association, the American Electric Railway Association and the Illuminating Engineering Society.

## Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (\*) indicates a project not previously reported.

#### RECENT INCORPORATIONS

\***Womelsdorf, Richland & Myerstown Street Railway, Womelsdorf, Pa.**—Application for a charter will be made by this company to construct a line from Womelsdorf via Newmantown and Richland to Myerstown, 7 miles, where it will connect with the Reading Transit & Light Company. Incorporators: Leroy Valentine, J. H. Mays, A. C. Klopp, Frank Rader and John L. Shultz, all of Lebanon.

#### FRANCHISES

**New Haven, Conn.**—The Connecticut Company has been granted authority by the Public Utilities Commission to double-track its Shelton Avenue line from Thompson Street to Harriet Street and its Winchester Avenue line from Division Street to Highland Street.

**Hutchinson, Kan.**—The Hutchinson Interurban Railway has received a franchise from the city commissioners to construct a single-track extension from Main Street east on Carpenter Street to Elm Street, north on Elm Street to Avenue F and west on Avenue F to Main Street.

**Baltimore, Md.**—At a recent hearing held before it, the Public Service Commission granted the request of the Maryland Electric Railways that it be permitted to exercise its franchise on St. Paul Street north of Merryman's Lane. It is stated that the Roland Park Company would practically finance the extension and pay all operating expenses for the next seven years.

**Baltimore, Md.**—The Public Service Commission of Maryland has authorized the United Railways & Electric Company to construct its proposed extension to Guilford.

**Brookline, Mass.**—The Boston Elevated Railway has been granted permission to relocate its tracks on Harvard Street. The company will establish a crosstown line on Harvard Street from Brookline Village to Allston.

**Lynn, Mass.**—The Bay State Street Railway has received a franchise from the Council to construct an extension on Rock Avenue from Hollingsworth Street to Grant Street, thence along Grant Street to Bay View Avenue to the present tracks on Hollingsworth Street.

\***Ecorse, Mich.**—The Samuel A. Merchant Company has asked the Council for a franchise to construct a line in Ecorse.

**Royal Oak, Mich.**—At a recent election residents of Royal Oak approved the thirty-year franchise asked for by the Detroit, Pontiac & Owosso Railway. Dr. Oliver M. Lau, Detroit, is interested. [Nov. 6, '15.]

**Brooklyn, N. Y.**—The Brooklyn, Queens County & Suburban Railroad, a subsidiary of the Brooklyn Rapid Transit Company, has asked the Public Service Commission for the First District of New York for permission to construct an extension over Metropolitan Avenue from Dry Harbor Road to Jamaica Avenue, Jamaica.

**Dunkirk, N. Y.**—George Bullock, receiver of the Buffalo & Lake Erie Traction Company, has asked the Council to amend the company's franchise in Dunkirk by which permission will be given to remove the tracks of the city belt line. The company claims to be losing \$15,000 a year by operating the belt line service.

**Portland, Ore.**—The Portland & Oregon City Railway has received from the Council a six-months' extension of time on its franchise to construct an extension from Oregon City to Portland.

\***Richland, Pa.**—The Womelsdorf, Richland & Myerstown Street Railway, which proposes to construct a line from Womelsdorf to Myerstown, has asked the Council of Richland for a franchise to construct a line in that city. The company has also asked the Council of Myerstown for a franchise within the borough limits.

## TRACK AND ROADWAY

**Fort Smith Light & Traction Company, Fort Smith, Ark.**—Surveys have been begun by this company for an extension of its Van Buren line to the Arkansas Zinc Company's smelter and probably to Alma.

**Municipal Railways of San Francisco, San Francisco, Ca.**—The Supervisors have directed the Board of Public Works to proceed without delay to complete the Church Street municipal line. Proceedings are also under way for the extension of the municipal railway on Market Street from Church Street to the Twin Peaks tunnel and from Van Ness Avenue to Kearny Street. The Board of Park Commissioners has unanimously refused to permit the extension of the Municipal Railway across Golden Gate Park on the lines proposed by the Public Utilities Committee of the Board of Supervisors. The Board stated, in taking this action, that it was not averse to permitting the railway to cross the park, but insisted that the route selected must meet with its approval. It was agreed that the Board would be willing to co-operate if the supervisors would adopt a course across the park at Twentieth Avenue.

**Boise-Bruneau Railway, Boise, Idaho.**—It is reported that construction of the proposed electric railway from Boise to Bruneau is assured with the final closing of the contract between the State Land Board and the Wickahoney Land & Water Company, which is promoting the line. The project will cost about \$1,000,000 and is being backed by the Thayer-Moore Brokerage Company of Kansas City. [April 22, '16.]

**Cairo & St. Louis Railway, Cairo, Ill.**—The Public Utilities Commission of Illinois has approved the contract for the sale by the Cairo & St. Louis Railway to the Cairo Electric & Traction Company of electrical energy for the operation of the street car system and distributing system in Cairo, Mounds City and Mounds.

**Kewanee & Eastern Electric Railway, Kewanee, Ill.**—General offices have been established at Kewanee by the Kewanee & Eastern Electric Railway. The company proposes to construct a line from Kewanee to Magnolia via Modena and Castleton. C. G. Lampman, engineer. [April 3, '15.]

**Iowa Railway & Light Company, Cedar Rapids, Iowa.**—The municipal electric lighting plant of Adair will be taken over by the Iowa Railway & Light Company within a few weeks and 24-hour service will be inaugurated by the company.

**Sioux City Service Company, Sioux City, Iowa.**—In connection with proposed improvements to its lines this company contemplates the abandonment of its West Third Street line and the extension of its Sixth Street line from Pierce Street to Jackson Street, to converge with other lines at Fourth and Jackson Streets.

**Kentucky Traction & Terminal Company, Lexington, Ky.**—Among the improvements planned by this company this year is the reconstruction of its Dewees Street line.

**Paducah (Ky.) Traction Company.**—This company will construct double-track on Broadway from Fourth to Seventeenth Streets.

**Bay State Street Railway, Boston, Mass.**—This company has asked the Council of Haverhill for permission to abandon its line on Cedar Street.

**Berkshire Street Railway, Pittsfield, Mass.**—This company will construct new track on North Street from Bradford Street south and will also lay new track on West and Tuler Streets.

**Detroit (Mich.) United Railway.**—Work has been begun by this company on the construction of an extension on Forest Avenue from Gratiot Avenue to Cadillac Avenue, north to Warren Avenue and east to the city limits. Work will soon be begun on the construction of a line on Davison Road from Oakland Avenue in Highland Park to Joseph Campau Avenue in Hamtramck. Inasmuch as Davison Road is to be paved from Oakland Avenue to the Grand Trunk tracks the track construction between these points will be of the standard type for paved streets. The line will be of interurban construction from the Grand Trunk tracks to Joseph Campau Avenue.

**Duluth-Superior Traction Company, Duluth, Minn.**—Plans are being made by this company to extend its lines to the fair grounds in Superior. The company is also considering the double-tracking of its East End line from the courthouse to the Nemadji River.

**Springfield (Mo.) Traction Company.**—This company plans to construct an ornamental concrete viaduct at the entrance to Walnut Grove Park. The cost is estimated at \$10,000. A. M. Torbitt, architect.

**Belmont & Northern Traction Company, Lincoln, Neb.**—This company advises that negotiations are now under way with the Lincoln Traction Company for the construction of its proposed line from Thirteenth Street and P Street, Lincoln, to Belmont. [Aug. 8, '14.]

**St. John, (N. B.) Railway.**—Residents of Simonds have asked the New Brunswick Legislature to compel the St. John Railway to carry out an agreement made in 1914 for the extension of the company's lines to Simonds.

**United Traction Company, Albany, N. Y.**—Plans are being considered by this company for the construction of an extension over Temperance Hill, Troy.

**New York, N. Y.**—The Public Service Commission for the First District of New York is advertising for bids for the construction of two more sections of rapid transit railroads under the Dual System, being Section No. 2 of Route No. 8, a part of the Fourteenth Street-Eastern District subway, and Route No. 31, being the Livonia Avenue elevated extension of the Eastern Parkway subway in Brooklyn, the first for operation by the New York Municipal Railway Corporation and the latter by the Interborough Rapid Transit Company. These two contracts will complete the letting of construction work on both lines. Bids on Section No. 2 of Route No. 8 will be opened on May 25, and on Route No. 31 on May 23.

**Interborough Rapid Transit Company, New York, N. Y.**—The contract for the Westchester Avenue branch of the new subway has been signed. The contractor, Lawrence C. Manuell, will proceed with the work of construction without delay. Work on the Lexington Avenue line which extends from the Grand Central Station to One Hundred and Thirty-eighth Street, where it will connect with the Westchester Avenue line, is nearly completed, and it is expected that trains will be in operation before the end of the year. The Jerome Avenue line, which also connects at One Hundred and Thirty-eighth Street with the Lexington Avenue branch and extends north to Woodlawn, 1½ miles south of Yonkers, is likewise nearly completed and will be in operation in the early fall.

**\*Akron, Ohio.**—Attorney General Turner has approved a lease of the bank of the Ohio Canal between Akron and New London to Frank R. Fauver and Glenn Brown. It is said that these men plan to construct an electric railway between these two points.

**Oklahoma (Okla.) Railway.**—This company reports that it is building a 16-mile extension from Edmond to Guthrie.

**Lake Erie & Northern Railway, Brantford, Ont.**—It is reported that operation will be begun on this company's extension between Brantford and Port Dover on May 15.

**\*Portland, Ore.**—Plans are being considered for the construction of an electric railway to extend from Berkely Station, through Sunnyside easterly, at the head of Pleasant Valley, to tap a timbered area in Clackamas County. J. D. Lee, L. H. Chambers and F. Viereck, land owners on the southern slope of Mount Scott, are interested.

**Portland Railway, Light & Power Company, Portland, Ore.**—It is reported that an agreement has been reached between the Portland Railway, Light & Power Company and the Oregon-Washington Railroad & Navigation Company, whereby both corporations will abide by the decision of the City Council in the division of that portion of the cost which they will be required to pay for the Sandy Boulevard viaducts in the proposed Oregon-Washington Railroad & Navigation Company regrade. The estimate for the construction of the eight viaducts over the tracks of the railway is \$560,000, of which 60 per cent will be paid by the railways, 20 per cent by the city, and 20 per cent by the property owners benefited.

**Lancaster & Berks Electric Railway, Lancaster, Pa.**—Work has been begun by this company on the construction of its proposed line from Womelsdorf to Kleinfeltersville. [Jan. 22, '16.]

**Montreal & Southern Counties Railway, Montreal, Que.**—Operation has been begun on this company's extension to Granby.

**Montreal (Que.) Tramways.**—This company has placed an order with the Standard Underground Cable Company of Canada, Ltd., Hamilton, for 1,500,000 c.m. paper insulated lead covered single conductor cable for the Bleury Street section of its underground conduit system.

**Houston, Richmond & Western Traction Company, Houston, Tex.**—Announcement was recently made that construction would be begun by this company on May 10 on its first division out of Gonzales. The company proposes to construct a line between San Antonio with an extension from Victoria to Austin. C. C. Godman, Kansas City, president. [March 18, '16.]

**\*Tazewell, Va.**—It is reported that a company is being organized to construct an electric railway from Tazewell to New Tazewell, about 2 miles. The Board of Trade may give information.

**Tacoma Railway & Power Company, Tacoma, Wash.**—Work will be begun in June or July on this company's proposed line across the Tacoma Avenue bridge fill. The proposed line will connect the South End line with Broadway, via Jefferson Avenue.

**Charleston (W. Va.) Interurban Railroad.**—The extension of this company's line from Cabin Creek Junction to Montgomery, a distance of 10 miles, has been suspended owing to the high price and difficulty of obtaining material.

#### SHOPS AND BUILDINGS

**Union Traction Company, Anderson, Ind.**—This company will begin the erection of a temporary station on its building site at the corner of Meredian and Twelfth Streets, Anderson. The company must vacate its present quarters by June 1.

**Bridgeton & Millville Traction Company, Bridgeton, N. J.**—This company will construct a new carhouse in Bridgeton in the near future.

**Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.**—It is reported that a new station will be built by this company at Standard to replace one recently destroyed by fire.

**Toronto (Ont.) Suburban Railway.**—This company will erect an office building at 938 Keele Street, Toronto. The structure will be 109¼ ft. long on one side, 100 ft. long on the other side and 28 ft. wide, one story high. The foundation walls will be of concrete and the main building walls of brick. The basement will contain boiler and coal rooms and a fireproof vault. The rest of the basement will be used for stores. The ground floor will contain a waiting room and express room, while the upper floor will contain offices, conductors' and motormen's room and lavatories.

**Monongahela Valley Traction Company, Fairmont, W. Va.**—It is reported that work will soon be begun by this company on the construction of a new three-story station building on Main Avenue, Weston.

#### POWER HOUSES AND SUBSTATIONS

**Tampa & Eastern Traction Company, Tampa, Fla.**—This company, which proposes to construct a line from Tampa to Lakeland, contemplates the construction of a power plant at Seffner. E. J. Binford, Tampa, manager.

**Iowa Railway & Light Company, Cedar Rapids, Iowa.**—It is reported that this company has awarded the contract for the construction of a new power plant in Perry to W. J. Zitterell & Company of Webster City. The plant will cost about \$100,000.

**Public Service Railway, Newark, N. J.**—This company has ordered one 35,000-kw. turbo-generator from the General Electric Company, for use in the Essex Station.

**Carbon Transit Company, Mauch Chunk, Pa.**—This company is in the market for a second-hand 300-kw. unit. J. F. Geiser, general manager.

## Manufactures and Supplies

### WIRE MANUFACTURERS DOING LARGE BUSINESS

Reports from the various wire and cable manufacturers, including those who have refused to accept war orders, concur in revealing a general condition of full capacity production in the factories. Although the railway wire orders comprise a fairly comfortable portion of the business, the greater bulk of the requirements are for the power and lighting fields, because of the much smaller amount of new railway transmission and line construction undertaken at present, particularly in the intensely populated East, where most of the railways are ordering only just what they urgently need in order to maintain their equipment in proper operating condition. Although the manufacturers are feeling the customary spring surge of orders incident to the return of seasonable construction weather, this year the annual spring wave has arrived somewhat earlier, owing to an endeavor on the part of the buyer to anticipate the rising prices of material. One company records last February as having been the best month, March and April also having been strong periods, and predicts the continuance of a good demand from those companies which have not yet followed the example of the earlier buyers. Another large concern describes the peak of orders as being more in the line of fine wire which is not very extensively used by the electric railways.

As a natural result of the war demand for copper, wire prices have increased about 60 per cent over last year, the present base price of bare copper wire being about 32 cents per pound as compared with about 20 cents per pound a year ago, and that of weatherproof wire about 31 cents as compared with 19 cents a year ago. In addition to copper costs the high cost of insulating materials has contributed toward the advanced price of protected wires and cables. In one plant, where aluminum wire is manufactured, production facilities are already crowded to the limits, and the company is no longer quoting prices on its material. In this case the great demand for the aluminum wire already under order now was believed to be partly caused by the market scarcity of copper. An interesting counter-tendency, however, is indicated by a recent instance where copper transmission wires were substituted for the higher priced aluminum wires, the latter being taken down from the line and sold for scrap.

Retardation of deliveries have been a general and serious complaint. As a typical example of the condition of deliveries as affecting prices, the following schedule now offered by a large concern may be cited: May deliveries in bare copper were 33¾ cents per pound; June deliveries, 32¾ cents; July deliveries, 32½ cents and August deliveries, 32¼ cents. One manufacturer is not quoting sooner than for June deliveries, and still another company refuses to deliver any orders before the fall, except to its biggest customers.

### ROLLING STOCK

**Berwick & Nescopeck Street Railway, Berwick, Pa.**, is considering the purchase of two single-truck cars.

**Shore Line Electric Railway, Norwich, Conn.**, has ordered two 44-ft. freight car bodies from the Wason Manufacturing Company.

**Quebec Railway, Light & Power Company, Quebec**, is building four double-truck pay-as-you-enter city cars at its Ste. Anne de Beaupré shops.

**United Traction Company, Albany, N. Y.**, has ordered from the Laconia Car Company ten single-truck cars of the same type as its last order.

**Milwaukee Electric Railway & Light Company, Milwaukee, Wis.**, is reported as having ordered 100 trucks from the Baldwin Locomotive Works.

**Tri-City Railway, Davenport, Iowa**, has ordered three city cars from the St. Louis Car Company and one single-truck snow plow from the McGuire-Cummings Manufacturing Company.

Sandwich, Windsor & Amherstburg Railway, Windsor, Ont., has ordered two single-truck, double end, pay-as-you-enter cars from the Preston Car & Coach Company.

Montoursville (Pa.) Passenger Railway is in the market for double-truck motor cars of ten-ton capacity for hauling crushed stone and sand.

Kansas City (Mo.) Railways, noted in the *ELECTRIC RAILWAY JOURNAL* of March 25 as having ordered fifty cars from the St. Louis Car Company, have increased the total order to seventy-five cars.

Southern Cambria Railway, Johnstown, Pa., has ordered from the Niles Car & Manufacturing Company two 50-ft. cars to be equipped with Baldwin trucks, G. E. 205 motors and G. E. Type K control.

Three Rivers Traction Company, Three Rivers, Que., has ordered from the Ottawa Car Manufacturing Company two single-truck, single-end, one-man, near-side cars and one single-truck, double-end, one-man, near-side car, to be equipped with Brill radiax trucks.

Worcester Consolidated Street Railway, Worcester, Mass., has just received from the Osgood-Bradley Car Company a sample prepayment car for operation on the Boynton Street-Elm Park line. If operating results prove satisfactory additional cars of the same type will be ordered.

San Francisco-Oakland Terminal Railways, Oakland, Cal., has applied to the Railroad Commission of California for permission to issue car trust certificates to provide funds with which to purchase twenty steel pay-as-you-enter cars and build twelve center-entrance, pay-as-you-enter cars for express service between Oakland and Berkeley.

Salt Lake & Los Angeles Railway, Salt Lake City, Utah, will probably be in the market soon for new all-steel cars in connection with the change in motive power on its line from steam to electricity. At present the company has three locomotives and twenty-four cars. H. A. Strauss, Harris Trust Building, Chicago, is consulting engineer.

New York (N. Y.) Railways has placed an order for seventy car bodies with the Southern Car Company. These will be used for storage battery operation and are to be of the same general type as the storage battery cars now in operation. The cars are expected to be in service within six months and are to replace the horse cars now in operation on Avenue C and Madison Street.

Schenectady (N. Y.) Railway has ordered ten 50-ft. center-entrance, all steel city cars and six 48-ft. all-steel interurban cars from the Cincinnati Car Company, through the W. R. Kerschner Company, Eastern sales agent. The city cars are to be duplicates of the cars now being built by the Cincinnati Car Company for the New York State Railways, Rochester Lines, and the interurban cars are to be duplicates of those under construction for the Utica Lines.

Toledo Railways & Light Company, Toledo, Ohio, through H. L. Doherty & Company, has ordered fifty cars, with an option to increase the number to one hundred, from the G. C. Kuhlman Car Company. The cars will be of the Cleveland type, with a few changes and will be equipped with Brill trucks; Westinghouse 2-motor equipment, H. L. field control and air-brakes; Tomlinson couplers, Smith heaters and National Pneumatic door control. It is planned to operate two-car trains during the rush hours.

#### TRADE NOTES

Perry Ventilator Corporation, New Bedford, Mass., has received an order to equip with ventilators the thirty cars now being built by The J. G. Brill Company for the Boston Elevated Railway.

The J. G. Brill Company, Philadelphia, Pa., has received a \$65,000 order from the Brooklyn Rapid Transit Company, Brooklyn, N. Y., for inside-hung brake riggings for 800 pairs of 22-E trucks for use on double-truck cars now in operation, which are equipped with air brakes.

Joseph A. Horne, general superintendent of the Yale & Towne Manufacturing Company, New York, has been elected second vice-president. Mr. Horne, who is also a director, has the entire management of the works at Stamford, Conn., and of all manufacturing operations of the company.

Holden & White, Chicago, Ill., have received orders from

the following railways for Miller Nonarc trolley shoes: Indianapolis Traction & Terminal Company, Des Moines City Railway, Waterloo, Cedar Falls & Northern Railway, Chicago & West Towns Railway, Alton & Jacksonville Railway, Chicago, and Harvard & Geneva Lake Railway. This company has appointed the U. S. Metal & Manufacturing Company as district representative in the Atlantic Coast States from New England to Florida. This announcement corrects an item which appeared in last week's issue, and which stated erroneously that Holden & White are representing the U. S. Metal & Manufacturing Company, whereas the latter company is really representing the former.

Samuel M. Vauclain, vice-president of the Baldwin Locomotive Works, has been elected a director of the Westinghouse Electric & Manufacturing Company, to succeed C. F. Brooker, who resigned. Mr. Vauclain is also a director of the Standard Steel Works, Midvale Steel & Ordnance Company, Cambria Steel Company, Philadelphia Trust Company, and a number of other well-known concerns.

William R. Garton, New York, N. Y., sales engineer with offices at 299 Broadway, has been elected vice-president of the Lansden Company, Inc., Brooklyn, N. Y., manufacturer of commercial electric vehicles. This company states that it has over 2000 vehicles in service, many of which are in the Philippine Islands, Australasia, England, France and other European countries, as well as in Central and South America.

Niles Car & Manufacturing Company, Niles, Ohio, has opened a salesroom at 1904 East Thirteenth Street, Cleveland, Ohio, for the sale of its new auto trucks, with E. M. Jones as manager. The company has arranged to make two models for the present. One is designed to carry from three-fourths of a ton to a ton, and the other, from two to two and a half tons. These two types are equipped with worm drive, with all parts of standard design. Service stations will be opened in various cities and it is said the trucks will be sold under prevailing prices through this plan.

Stone & Webster Engineering Corporation, Boston, Mass., at present has under construction approximately 125,000 kw. in capacity of electric railway and central station steam plants. One of the largest of these in the railway field is a 35,000 kw. addition to the South Boston station of the Boston Elevated Railway, together with the building of a 4000-kw. rotary converter substation at Dewey Square, Boston, which will be used in connection with the operation of the Dorchester tunnel. A 15,000 kw. extension of the Lowellville, Ohio, station of the Republic Railway & Light Company is nearing completion, and work is under way upon a large terminal station at Dallas, Tex., for the Dallas Interurban Terminal Association.

#### ADVERTISING LITERATURE

Underwriters' Laboratories, Chicago, Ill., have issued a booklet which describes the organization, purpose and methods of this concern. Laboratories are maintained in a number of cities throughout the United States for the examination and testing of appliances and devices. Whenever reports are ready to be issued the favorable opinion is followed up by one of the following three forms of supervision over goods marketed under the approval. The oldest form is the re-examination service, in which the manufacturer agrees, during the continuance of the approval, to pay certain fees annually, with which the laboratories defray the cost of obtaining samples in the open market, and of making examinations and tests one or more times a year. The second form of supervision is the instruction service which includes regular and frequent examinations and tests of products at factories by engineers of the laboratories together with supplementary examinations at the laboratories of samples purchased in the open market. This forms a countercheck on the factory inspection work. The label service, which is the third form of supervision, consists of inspections of devices and materials at the factory and the labeling of standard goods by stamps, transfers or labels whereby they may be recognized wherever found and, in addition, of systematic supplementary examinations and tests of samples of labeled goods purchased in the open market. The booklet also illustrates and lists the prices of the various types of labels.