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ELECTRIC RAILWAY JOURNAL

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Vol. 70
No. 11

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SEPTEMBER 10, 1927

Look for the

Winners

NEXT WEEK announcement will be made of the awards in ELECTRIC RAILWAY JOURNAL'S Maintenance Competition. The material received was of such a valuable character that it was no easy matter for the judges to pick the winners who will receive the capital prizes. In view of the wealth of material submitted it was decided to add a fourth prize, making the awards as follows: First prize, $200; second prize, $100; third prize, $50, and honorable mention, $25.

Even though the capital prizes have been awarded, maintenance men should bear in mind that the competition for the monthly prizes of $25 each still continues, and contributions will be received up to April 30 of next year.

Watch for the winners in the Annual Convention Number next week.

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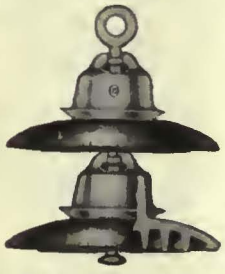

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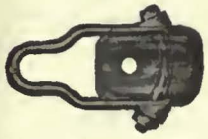

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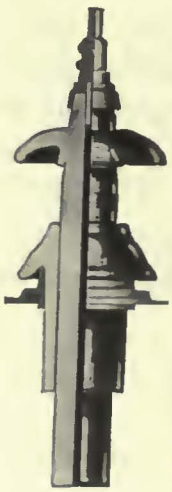

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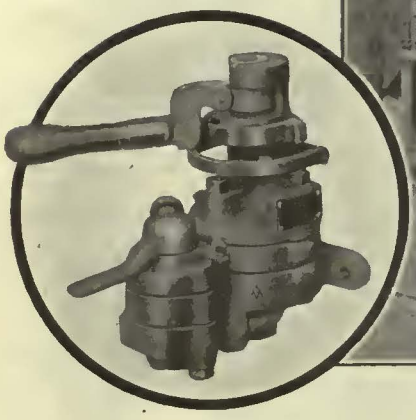

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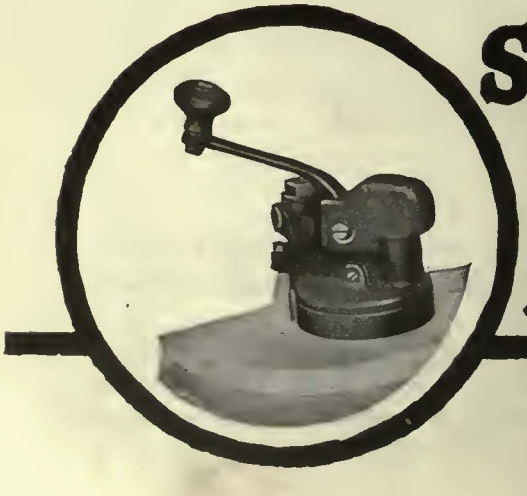

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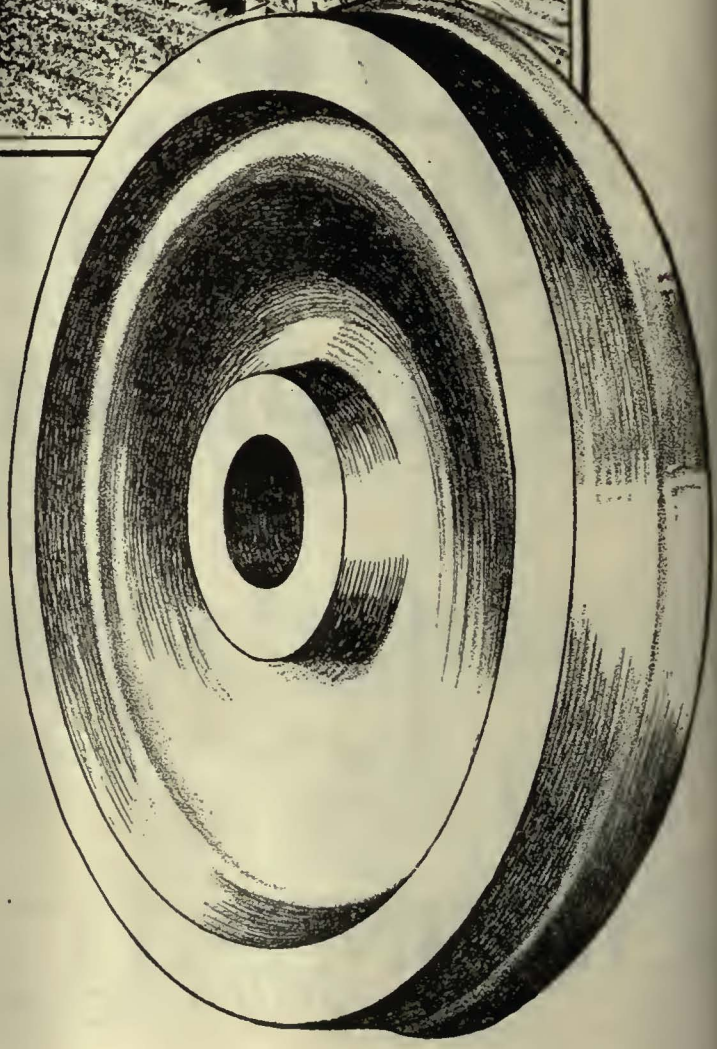

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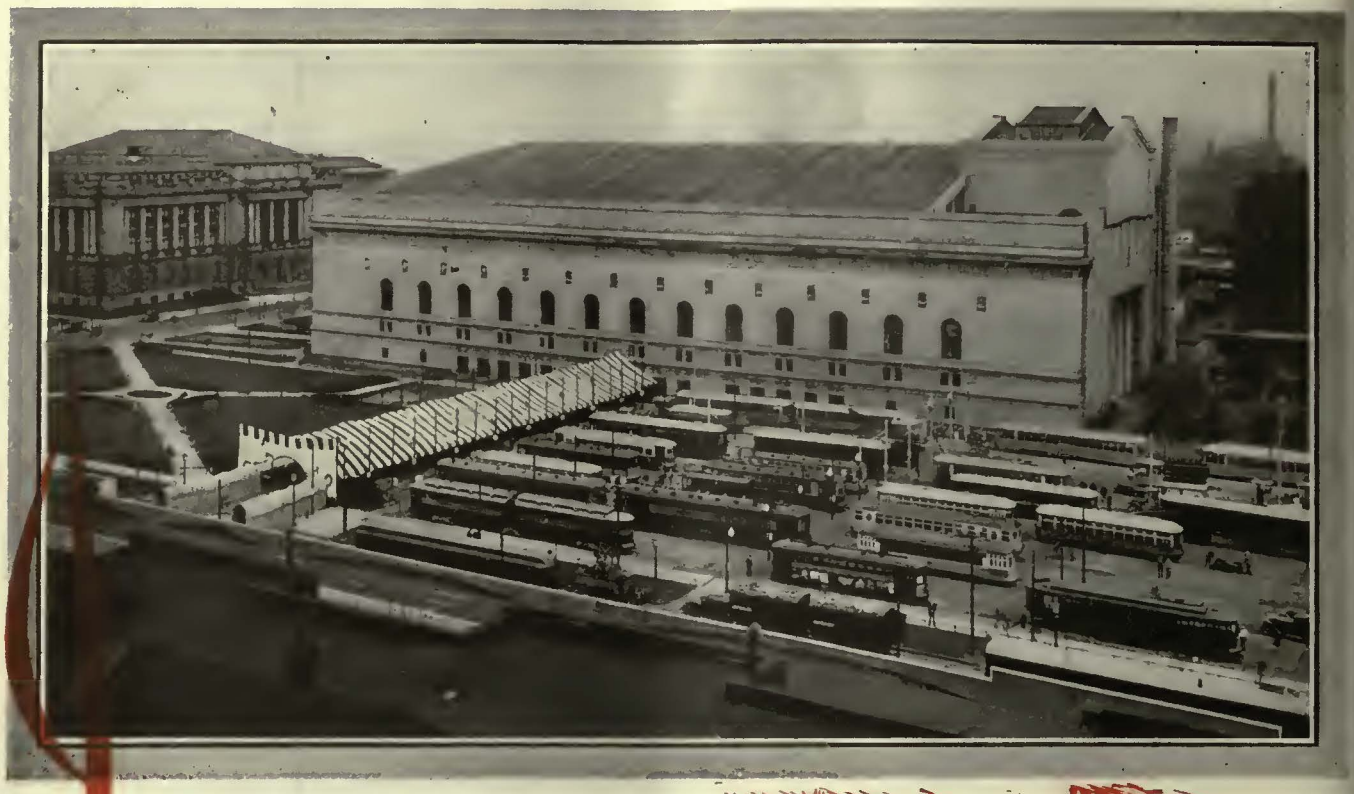

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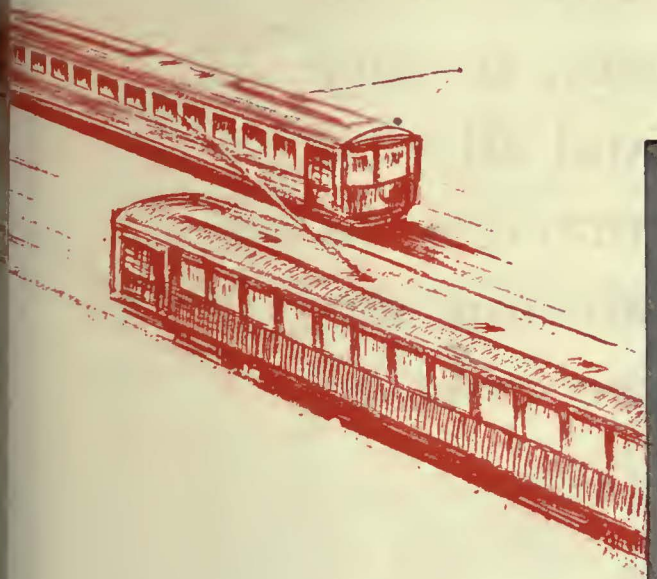
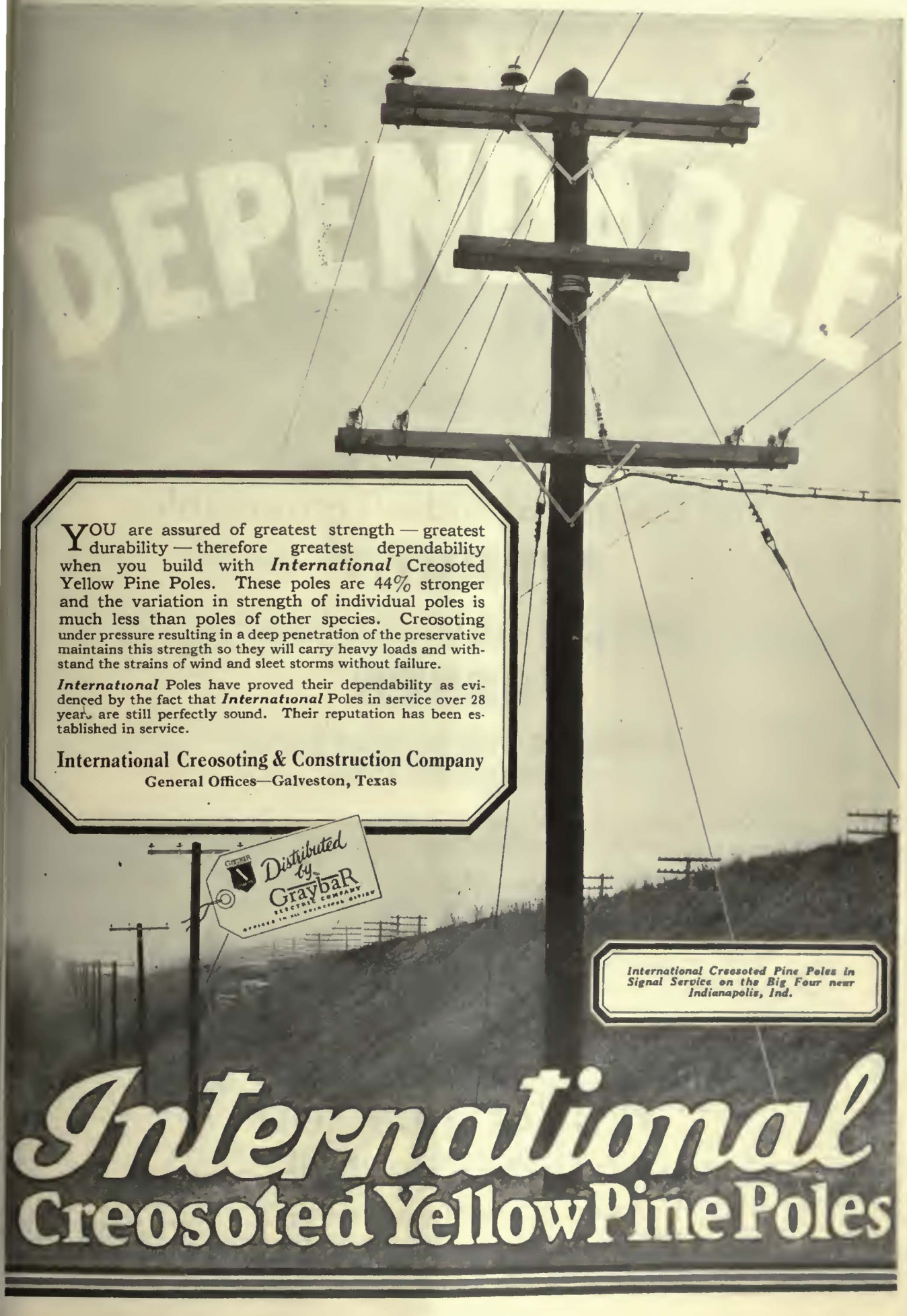


These questions will be answered at Cleveland

How do the Quality Shops express their interpretation of keeping community transportation up to date?

What does fitting the right car in the right place really mean?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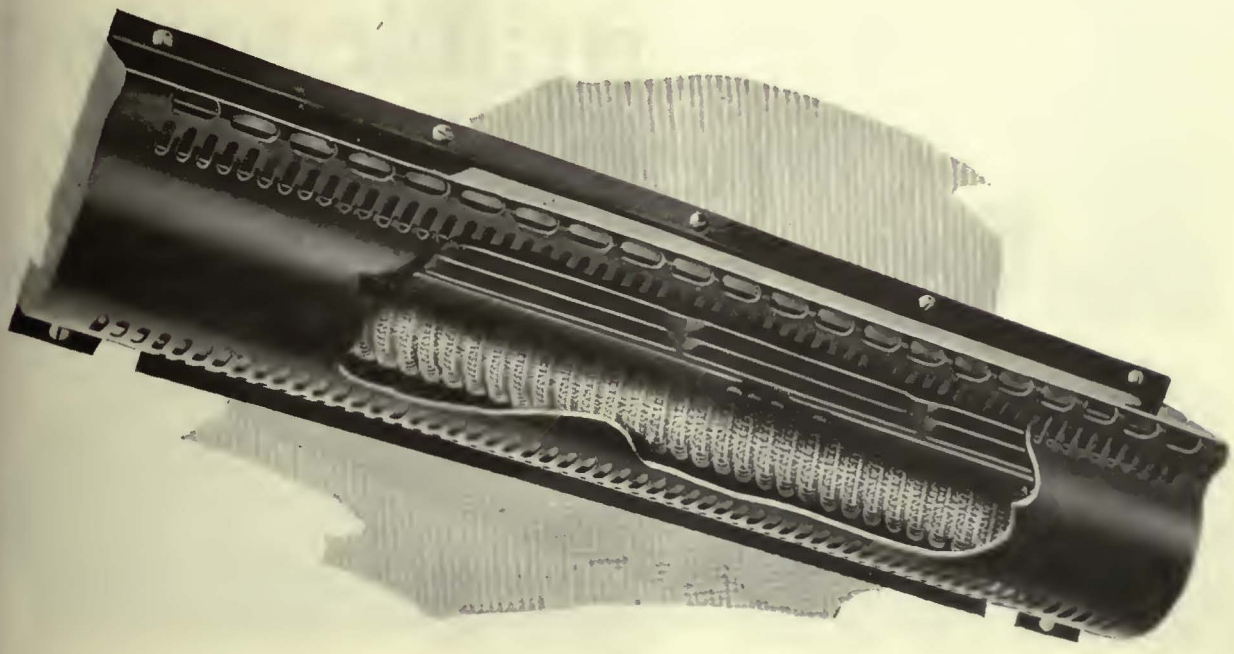

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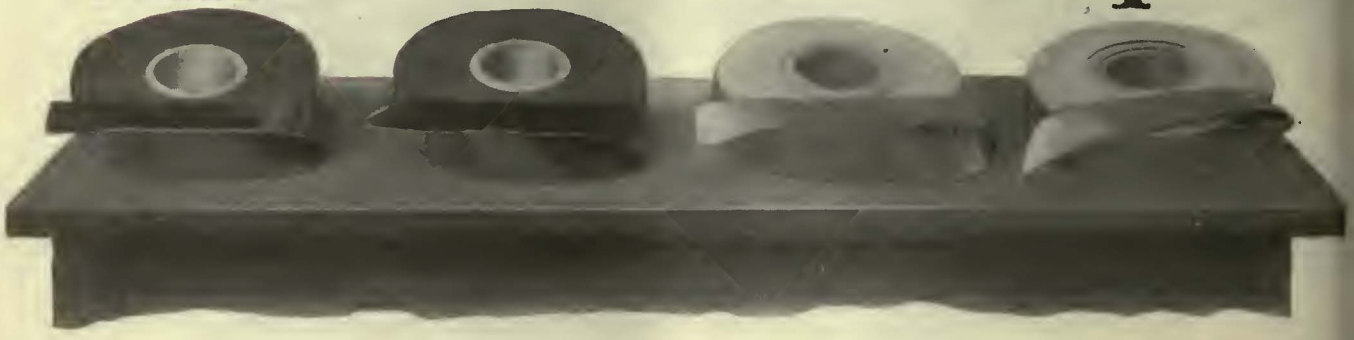

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GENERAL ELECTRIC

MERCHANDISE DEPARTMENT, BRIDGEPORT, CONNECTICUT

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review
Published by McGraw-Hill Publishing Company, Inc.
CHARLES GORDON, *Editor*

Volume 70 New York, Saturday, September 10, 1927 *Number 11*

Co-operation of Manufacturers Will Insure Interest in Car Exhibit

WORD went out some time ago from the committee on co-operation with manufacturers calling attention to the importance of capitalizing to the utmost on the value of this year's car exhibit. Facilities for showing cars are better in Cleveland than they have ever been for an electric railway association convention. In the opinion of the manufacturers' committee, therefore, it is important that all manufacturers co-operate to insure that the maximum value be derived for the industry from the showing of cars while there is the opportunity.

The committee suggests that all manufacturers, whether or not they are directly interested in the production of cars or car parts, help to insure adequate attendance of visiting delegates at the car exhibits. The job is simple. First look at the cars yourself and study the development shown. Then talk about them to every delegate who will listen. Finally, urge the railway man who visits your booth, after he has seen your own exhibit, to be sure to inspect the new cars on display. Better still, if you can do so take him out personally to see the cars. Talk about them and point out the new things of interest. You will be doing something not only for the industry, but you will get a better understanding of the general situation and of the progress being made.

Ship Early to Exhibit Intelligently

IN THE ISSUE of this paper two weeks ago was published a résumé of the shipping instructions sent out by the exhibit committee for the Cleveland Convention in October. They were clearly detailed and they need no further comment. It is not in the method of shipping that a possible danger lies to the ultimate success of the exhibit, but rather in the question of early shipping and erection. One has but to recall the helter-skelter confusion of the first days of some of America's biggest exhibitions to have this evil of late shipping forcibly impressed upon the mind.

The exhibit that is partly completed after the official date of opening receives scant attention from early visitors. "I'll come back here later," they say—and then they don't. The whole business leaves a bad taste in the mouths of those for whom the exhibit is specially designed. By Friday evening, Sept. 30, every exhibit at Cleveland should be completed, and by noon on Saturday, booths must be ready for the visitors' inspections.

Since last October the exhibit committee, from Colonel Alexander and Director Fred Dell down, has worked unceasingly to make the 1927 show an outstanding success. Unless one is familiar with the ramifications, the mass of detail and the real generalship necessary to promote a pageant of this character, he cannot appreciate the importance of complying with every suggestion contained in the committee's shipping and arrangement instructions, especially as at this moment the industry stands on the threshold of a new era of development in which the manufacturer will play a tremendous part.

In this connection for manufacturer and operator alike the JOURNAL can think of no better advice than that given by the Bard of Avon: "There is a tide in the affairs of men which, taken at the flood, leads on to fortune. . . . We must take the current when it serves or lose our ventures."

In other words, the tide of progress in our industry is at the flood of progressive ideas. Concretely expressed in exhibits these ideas may be weighed in the balance at Cleveland, if they are presented at the psychological moment. The half-filled booth, the confusion wrought by saw and hammer, will not contribute to an adequate presentation or a sober contemplation of these ideas. Ship early to exhibit intelligently.

Duplication, Alternation, or Co-ordination

HOW best to fit the bus into the general transportation scheme in the territory served by Public Service Railway of New Jersey has long been a difficult problem. Bus operation originally was developed by independent owners and no effort was made to avoid duplication of facilities already existing. On the contrary, practically every bus route was laid out with the deliberate intention of stealing the cream of the traffic from some railway route. This bus business expanded rapidly until the State Legislature passed an act which more or less checked further increase in the number of buses. The number in operation at the time of the passage of the law was so large, however, that the competition was ruinous to the railway.

Several years ago the parent company, the Public Service Corporation, with a view to co-ordinating rail and bus operation, organized the Public Service Transportation Company as a bus-operating subsidiary. Hundreds of the independent operators were bought out, but a small number demanded such exorbitant prices that the company declined to purchase their equipment and rights. The mixed ownership of buses was a stumbling block in the way of real co-ordination. It was obvious that improvement in transportation facilities could be accomplished by removing the buses to streets other than those on which the railway operated its cars, but the independents objected to any such change. A certain part of the public found the duplication of service to be convenient, and they also opposed any change.

Difference in the rates of fare on the cars and buses further complicated the situation. The independent buses, free of most of the financial burdens imposed on the railway, were able to give service at lower fares. On routes where this could not be done, the buses did not operate at all. The lower fare on the buses was a potent influence behind the public opposition to any change in route.

In this situation the best that the company was able to do was to develop a system of alternation. Schedules

were arranged so that cars and buses operating on the same streets alternated with each other instead of running side by side from one end of the route to the other. This gave an even headway shorter than that which had previously been given by either the cars or the buses, and made it possible to save a certain amount of duplicate vehicle mileage. The result, however, was far from being a real solution of the transportation problem.

Recently a comprehensive survey of the whole transportation system in the city of Newark was made for the mayor by the engineering firm of Parsons, Klapp, Brinckerhoff & Douglas. An abstract of the report appears elsewhere in this issue. It goes straight to the heart of the matter and states unequivocally that there is no need for duplication of service on the same streets in this territory. Rerouting of buses to serve districts lying between the railway lines is recommended. Equalization of fares is emphasized as a necessary adjunct to this scheme.

Many other interesting points are touched upon in this report. Without minimizing the importance of the other phases, it may be said that the recommendations for coordination of bus and railway service are the outstanding features. These recommendations are now before the municipal authorities and it is to be hoped that active steps may soon be undertaken to bring about this desirable improvement in transportation facilities.

The Stone That Was Rejected

MICHELANGELO'S wondrous representation of young David was said to have been cut from a stone spoiled, rejected and abandoned as worthless by an unskilled workman. Many passed by this fine specimen of Carrara marble as it lay among the waste and rubbish on a street in Florence until the sculptor saw the beauty within. Likewise out in Kansas junk seemingly useless awaits only the touch of the reclaimer endowed with patience and skill sufficient to convert it into a thing of real utility.

Some twenty years ago this so-called interurban was placed in service. According to recent indictments, apparently well justified, its equipment and appurtenances, only lately retired from service, are reminiscent of that day. The road had never boasted a new car since its inception. When so-called new rolling stock did appear, it was transported from other properties willing to strike a bargain over second-hand equipment. That this floundering project would succumb in a flood tide of de luxe cars, fast schedules, trained employees and willing managements was inevitable. The enigma of a broken-down, neglected railway in the present era will answer partially, though belatedly, William Allen White's question "What's the Matter with Kansas?"

But a day of atonement may yet come for the sins of omission and commission on the part of this railway management, whether culpable or not. Efforts are being made to restore the service largely on the faith that local people have in the line. In this scrap heap there appears to lurk material replete with possibilities for creating a railway system which gives promise of serving all the better for its having been almost ruined. If in capable hands a thing of beauty can be made from material seemingly marred beyond redemption, may not a defunct railway, said to have failed not because of lack of patronage but through "ultra-conservatism," be fashioned into an up-to-date utility? There are many instances to prove that this hope is not unreasonable. And as the unveiling of "David" caused a great sensation, so may the hoped for resumption of this road be celebrated with the appearance of de luxe cars ushering in a new régime with its shibboleth, "satisfied customers."

Another Good Report from Toronto

PROBLEMS not unlike those experienced in the conduct of private companies confront the municipality that attempts to run its railway system. This is apparent from the report of the Toronto Transportation Commission, digested elsewhere in this issue. The statement on the whole makes a very creditable showing. The commission, however, has felt called upon to issue a warning that extensions into unprofitable areas cannot be made without danger of having to raise the fare. A growing city with new suburbs and new subdivisions creates a problem in transportation. Householders are loath to move into a section not conveniently served by cars. The agitation for service grows and by and by must be met. As the Toronto *Globe* points out, if the commission supplies a service too soon, it will lose money, the deficit will pile up and cause borrowing. Borrowed money requires additional funds for the payment of interest. Thus the vicious circle grows. On this point the commission says:

> One of the most difficult conditions your commission has to meet is the constant demand for extensions of its rail lines and bus services into localities from which practically no additional revenue can be derived. While your commission recognizes its obligation as a publicly-owned utility to provide city-wide service, yet it must have regard for fundamental economic considerations if the present rates of fare are to be maintained. The revenue from the universal fare system has varied only slightly from year to year. The problem of administering the system would be greatly simplified if there were a moderate and consistent yearly increase in revenue.

The *Globe* also shows that the system on an average fare of 6.16 cents pays its way, provides for depreciation, wipes out almost $1,000,000 yearly on "intangible assets" for which the city had to pay in acquiring the system, and has a surplus of $76,961, or a little more than one half of 1 per cent on the gross income.

This, of course, is a comfortable but not a buoyant condition. The competition of private motor cars constantly cuts into revenues and it is not likely to decrease in the slightest. As the commission has made plain, improved business conditions contributed last year to the increase in revenue. Despite this, however, 5,500,000 fewer passengers were carried in 1926 than in the record year established in 1923. The increase in gross income over 1925 was partly due to the increased development of motor coach traffic and partly to the aforementioned improvement in the general business conditions in the Toronto district.

A difficult condition confronted the commission from the very inception of the municipal system. Money has been spent with a free hand, but one not too free. The conclusion of the *Globe* seems to be sound that for the immediate future the commission appears to be on safe ground without disturbing the fare. The service, generally speaking, is highly creditable. The personnel is, indeed, very able, but it never could have done the things it has done had it not been unusually free from political interference. In short, an able management has been left largely untrammeled, a condition under which the greatest success is assured by approximating the conditions of private enterprise.

What European Departmental Organization May Teach Us

SEVERAL articles in recent issues of this paper on European street railway practice suggest the question whether railway companies in this country can learn much from foreign methods. In view of the far greater extent of electric railway development in America than in any other country and the ready exchange of information, is it not probable that Americans already know the best methods of electric railway operation?

Undoubtedly in number of miles and cars in operation, America leads other nations, but size is not necessarily synonymous with quality or even with opportunity for progress. For example, in the United States, the field of electric railway operation is so large that much of the manufacturing can be done in comparatively large quantities. This makes the employment of standardized equipment almost obligatory from an economic standpoint. But in Europe, because of high tariff walls, each country is largely dependent on its own production, and the demand for electric railway equipment in each is comparatively so small that the same advantages cannot be gained from standardization. Hence there is greater diversity of practice, and possibly for this reason more opportunities of finding a new and better way of carrying out a certain task. In the form in which this method is used abroad it may not be always directly applicable to American conditions, but it may often suggest a method which would be suitable.

The leading European article this week relates to company organization. Most American managers are accustomed to think that a company organization must be largely along certain lines, but here is a railway company with the responsibilities grouped in quite a different way, yet functioning very successfully. Briefly, there are only three general departments, which may be defined as (1) financial and secretarial, (2) operation and engineering, and (3) legal and executive. In this country, the first and second would be divided into at least two each, often with three or four departments to cover "operation and engineering."

A second interesting feature of the Paris organization is the position given in the departmental arrangement to research work. There are two independent research departments, each along quite separate lines. One handles transportation methods and also has the duty of compiling the schedules. But in both this and its transportation research work it is entirely independent of the transportation department, reporting directly to the manager of operation and engineering. The other research department is devoted to technical research, and it is as independent of the engineering department as the department of transportation research is independent of the transportation department.

From the American standpoint there may be some objections to this plan, but at least it seems to give both research departments a freer field for action than if that devoted to transportation research reported to the superintendent of transportation and that on technical research reported to the chief engineer. This latter plan, usually followed here, means that recommendations for a change in either engineering or transportation methods, based on research, have to originate in the department concerned; in other words, they become essentially the criticism of a superior by a subordinate. In the more independent departmental arrangement used in Paris, this objection does not hold. In practice, it may not be a serious one, but it is worth considering. Still another interesting feature in the organization is that departments or sub-departments to discover better ways of doing things are not confined to transportation and engineering. The executive department also has its research department, although its duties, as explained in the article, are not confined to studying new and better ways of carrying out administrative work.

The Battle of Smoke

SHOULD passengers on the street cars be allowed to smoke, or should the present rule against smoking be kept in force? In this manner *Two Bells*, the leaflet distributed on the cars of the Georgia Power Company, presents to its readers an old problem for discussion. The Atlanta company is asking for expressions of opinion on which it may base its decision to retain or amend the no-smoking rule. Years ago smoking was permitted under certain conditions. The no-smoking rule was adopted to please the majority of the car riders, but that was when few gentlemen and no ladies smoked in public. Now times and customs have changed and perhaps the opinion of the majority is different.

Atlantans are taking considerable interest in the controversy and are sending in many letters. Strange to say, most of the replies evade the main question to discuss a secondary one, the feminine angle of the referendum. A typical correspondent states, "Though I am too old to be classified a flapper I am not opposed to women smoking and I should like to ask, if the no-smoking rule were abolished, would ladies be permitted to smoke on the cars the same as men?"

The objectors are even more emphatic than those in favor of the change, as witness:

"What! Permit smoking on the street cars? I should say not! How would you like to sit next to a man who was smoking an old pipe or a cheap cigar?"

Although the subject is live at present in many cities it is not new. From an operating standpoint it is highly undesirable to set aside sections of a car, or worse still entire cars, for smokers, since it makes it difficult to distribute the load. There is also the problem of maintaining a smoking compartment in a sanitary condition. Patrons who advocate the no-smoking rule further maintain that smoking and carrying smoldering cigars, cigarettes or pipes in a car is improper and unreasonably unsafe. Some go further and hold that aside from the danger of filling the eyes and throat with smoke and subjecting clothing to sparks the habit has a baneful influence on "ethical purity." Smokers, on the other hand, claim that these arguments are not valid and that since they are in the majority the majority should rule.

Two Bells made a worthy comment on the argument in its opening statement, "This is going to be the battle of smoke, with plenty of the smoke of battle." While it may be settled there always will be the difference of opinion, as voiced on one side by those who hold that it is "the inalienable right of mankind, as guaranteed by the Constitution and the laws of the land, to breathe fresh and pure air, uncontaminated by unhealthful and disagreeable odors," and on the other side those who maintain "the inalienable right of man to indulge in a good Havana."

Central Business District of Newark, N. J., as Seen from the Air

Photo by Fairchild Aerial Surveys, Inc.

Solid white line shows the route of the Morris Canal which will be converted into a trolley-subway station between the Pennsylvania Railroad station and Bloomfield Avenue, with intermediate entrances and exits for cars operated on connecting lines. Dotted line shows the proposed trolley-subway to be built later under Broad Street from Washington Park to Clinton Avenue. It is proposed to extend the Hudson & Manhattan tube service to a new station near the intersection of the north-south and east-west subways.

A—New Pennsylvania Railroad station.
B—Public Service Terminal.
C—Proposed H. & M. station.
D—Present H. & M. station.

Transportation Survey

Made in Newark

Rerouting of buses to reduce duplication of service, equalization of fares and curtailment of parking are recommended in engineers' report. Desirable development of rapid transit facilities outlined

FROM the traffic and transportation standpoint as well as economically and commercially, the city of Newark, N. J., is an integral part of the New York Metropolitan area. With a population of 465,000, together with widely diversified industrial and commercial activities, it ranks as the most important sub-center in this district. At the same time Newark is a fully developed city, with its own business and residential areas, and must be considered also as an independent center. Transportation problems arising from this situation have been the subject of several months study by Parsons, Klapp, Brinckerhoff & Douglas, engineers, New York, N. Y., and a comprehensive report recently has been submitted to the municipal authorities.

To further the growth of Newark as a business center, the report states that three distinct classes of service should be developed: First, a local service of existing buses and trolleys, confined essentially to Newark and the immediate vicinity; second, a de luxe or semi-de luxe bus service operated to towns and cities outside of Newark and centering in the business and shopping districts; third, a rapid transit system arranged to co-ordinate with the local trolley and bus systems and with the commuter service on the steam railroads and the Hudson & Manhattan tubes.

Rerouting of Buses Needed

On the main thoroughfares in and out of the central business district of the city the report states that trolleys now carry approximately 34 per cent of the total traffic, buses 33 per cent and passenger automobiles, including private vehicles and taxicabs, 33 per cent. Traffic checks, however, show heavier loading of the buses than of the trolleys on a number of routes where both occupy the same streets. That trolleys and buses are operating on the same street is due largely to the original creation of the bus service as an independent competitive system and partly to the effort made to supply service by buses during the trolley strike several years ago. According to the report there is no necessity in a territory of this extent for the concentration of two classes of transportation upon the same street.

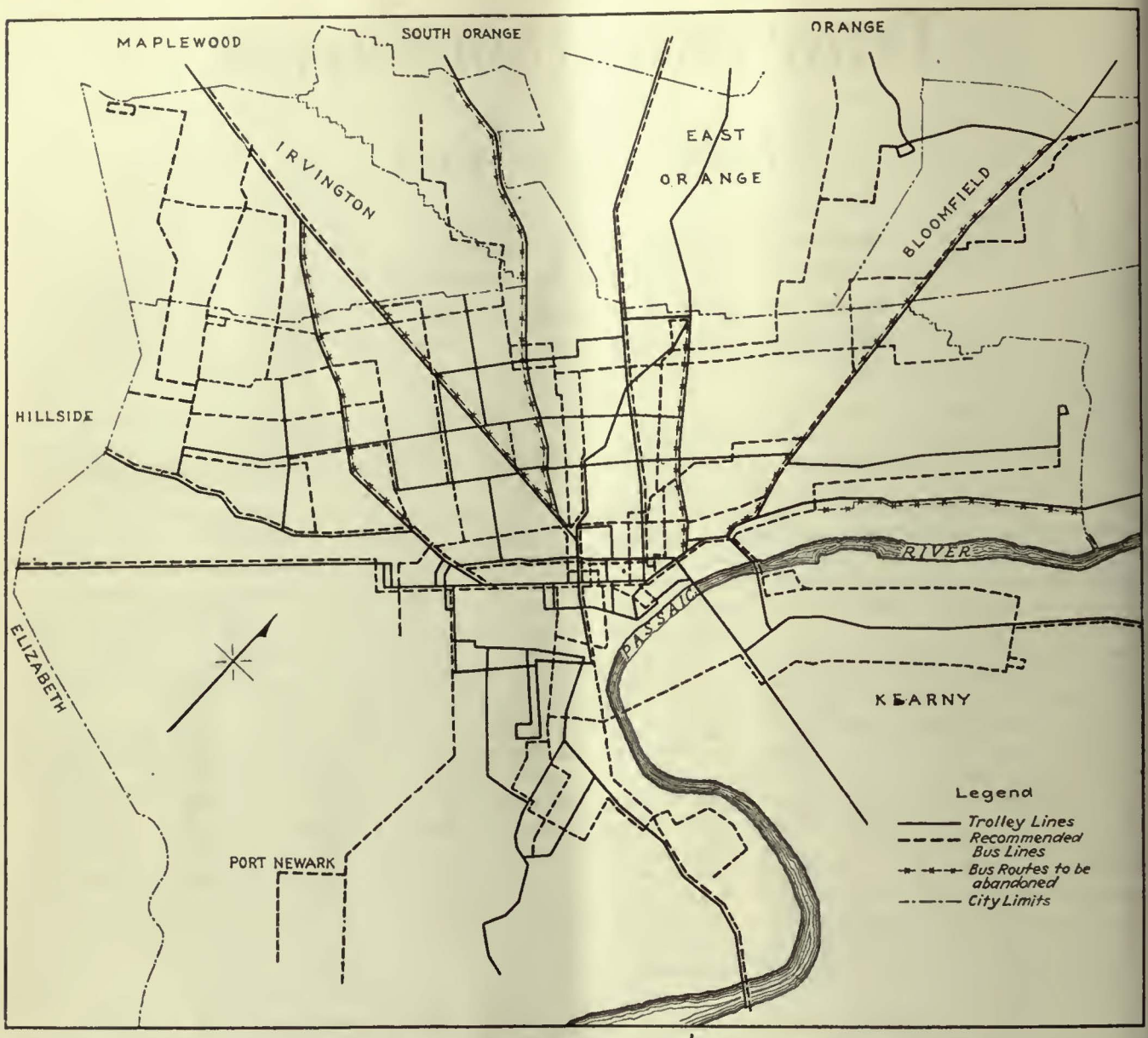
All transportation facilities must be utilized in the most efficient and effective way if the present 5-cent fare within the city limits is to be maintained. This means a co-ordination of both railway and bus service, so as to load them uniformly without overcrowding. The report states that 80 per cent of the passengers using lines entering the downtown district want to be delivered along Broad or Market Street. For that reason the greater part of the service of both cars and buses must be continued along those thoroughfares, the engineers declare. In the outlying residential districts, however, greater convenience to the passengers and more equal loading of vehicles could be obtained by shifting some of the buses to other streets parallel to their present routes. This would divide the districts between existing trolley lines by bus routes traversing sections not directly served at the present time. With schedules properly adjusted this rerouting would tend to relieve overcrowding by a better distribution of the loading between buses and trolleys and bring utilization of both vehicles to a more even balance. Present and recommended routes are shown on an accompanying map.

Full benefit of such rerouting, however, cannot be developed until an equal fare is charged on both bus and trolley lines serving the same territory. On account of the irregular outline of the city a number of lines well located for the convenience of the public traverse portions of Newark and one or more urban communities. The older trolley lines have established fare zones, corresponding generally with the limits of Newark. The newer bus lines, on account of their original competitive operation, have a single fare, against a doube fare on the trolley, although both are now operated by the same company. Equalization of these fares is considered by the engineers to be of prime importance.

The question of adequate service must be considered in relation to the fare. The report states that it cannot be hoped for a 5-cent fare to give a seat to every passenger on zones of such length as occur in this system. During rush hours a reasonable number of standees must be carried. Moreover, if enough buses and trolleys were operated to give a seat per passenger congestion would be so increased that they could not get though the streets at reasonable speed during the rush hours.

Parking Restrictions Recommended

Progressive steps must be taken by the city authorities to eliminate parking at critical points in the interests of the general traffic movement in these localities. Critical points occur opposite the passenger loading platforms of the trolley cars, where the width of the street is less than elsewhere. Parking along the curb opposite these loading platforms is contrary to ordinance. Observation of existing conditions indicates, however, that automobiles are sometimes parked the full length of the curb opposite loading platforms. This restriction should be extended 30 ft. beyond the ends of the platform, and steps should be taken to see that the regulation is observed. Double parking is also contrary to ordinance and should be stopped.



Present car and bus routes in Newark, N. J., and changes as recommended in report made recently by Parsons, Klapp, Brinckerhoff & Douglas. It is proposed to shift the bus routes in the outlying districts to streets on which no cars are operated, thereby eliminating much duplication of service and also accommodating additional territory. No changes are recommended in existing car routes.

A tabulation in the report indicates that 86 per cent of the automobile drivers observe the one-hour parking limit. If the 14 per cent violators had observed the ordinance, the curb line space which actually accommodated 9,679 cars would have accommodated 14,625, an increase of 51 per cent. Better observance of the ordinance, it is said, must come from force of public opinion, as the police cannot at any reasonable expense keep track of every car at all hours of the day.

Traffic conditions on Broad and Market Streets have been the subject of special study. Broad Street from Lincoln Park to Washington Park and Market Street from the Court House to the Pennsylvania Station constitute the two heaviest traffic streets in Newark and their intersection is the heart of the shopping, financial and business district. The vehicular traffic over this intersection is equal to and on some days exceeds that at Fifth Avenue and 42d Street, New York City. It is stated that a twelve-hour traffic check at this intersection between 8 a.m. and 8 p.m. on July 23, 1926, showed 30,828 vehicles crossing, comprising street cars, buses, automobiles, taxicabs and trucks, carrying more than 205,000 persons. The vehicles were divided as follows: Street cars, 2,623; buses, 4,412; automobiles, 17,015; taxicabs, 1,565, and trucks, 4,713.

Any obstruction of these streets which cuts off a lane of traffic necessarily delays all of the passengers in some degree, the report states. During rush hours parking probably causes at least five minutes delay to each passenger. This means a loss of more than 12,000 man-hours every weekday on these two streets. A check of the speed of cars and buses on Market Street from the Court House to the Pennsylvania Railroad Station, Dec. 20, 1926, compared with a similar check during the evening rush hour made Jan. 27, this year, when parking was prohibited, showed a time saving over this route of 2.34 minutes on the trolleys and 2.14 minutes on the buses, due to the increased freedom of vehicular movements on the later date. A substantial increase in speed was shown also by the buses on Broad Street. All automobile traffic on both streets was greatly accelerated.

A comprehensive view of Newark's transit situation,

the report states, must recognize that before many years a subway either for rapid transit trains or for preliminary use by street cars will be required under Broad Street, at least from Clinton Avenue to Washington Park. Rapid and convenient transportation free from surface traffic interferences will be required to develop Newark's business districts between the above-mentioned parks. Such a section of subway if used at first for trolley cars will ultimately serve as a rapid transit route.

Purchase of the bed of the Morris Canal, the report continues, established the obvious east and west rapid transit route. Development of this line between the Pennsylvania Station and Bloomfield Avenue is recommended as an initial step, with possible extension later. This should be designed for use as a trolley subway, although it will ultimately be required for rapid transit trains. The extension of the Hudson & Manhattan tubes to a terminal under Military park is proposed to give a three-point delivery for that service at the Pennsylvania Station, the proposed station at the southerly end of the city, and the terminal under the park. This, the report declares, would relieve rush-hour congestion.

Construction of a terminal under the park is important because it is the only point at which a general transfer station can be established from which any section of Newark can be reached with a single change. Eventually it would become the intersection of the subways in Broad Street and the canal bed. The proposed terminal site, the report points out, is the heaviest loading point in the city at the present time. A suggested arrangement of facilities at this location is shown in an accompanying drawing.

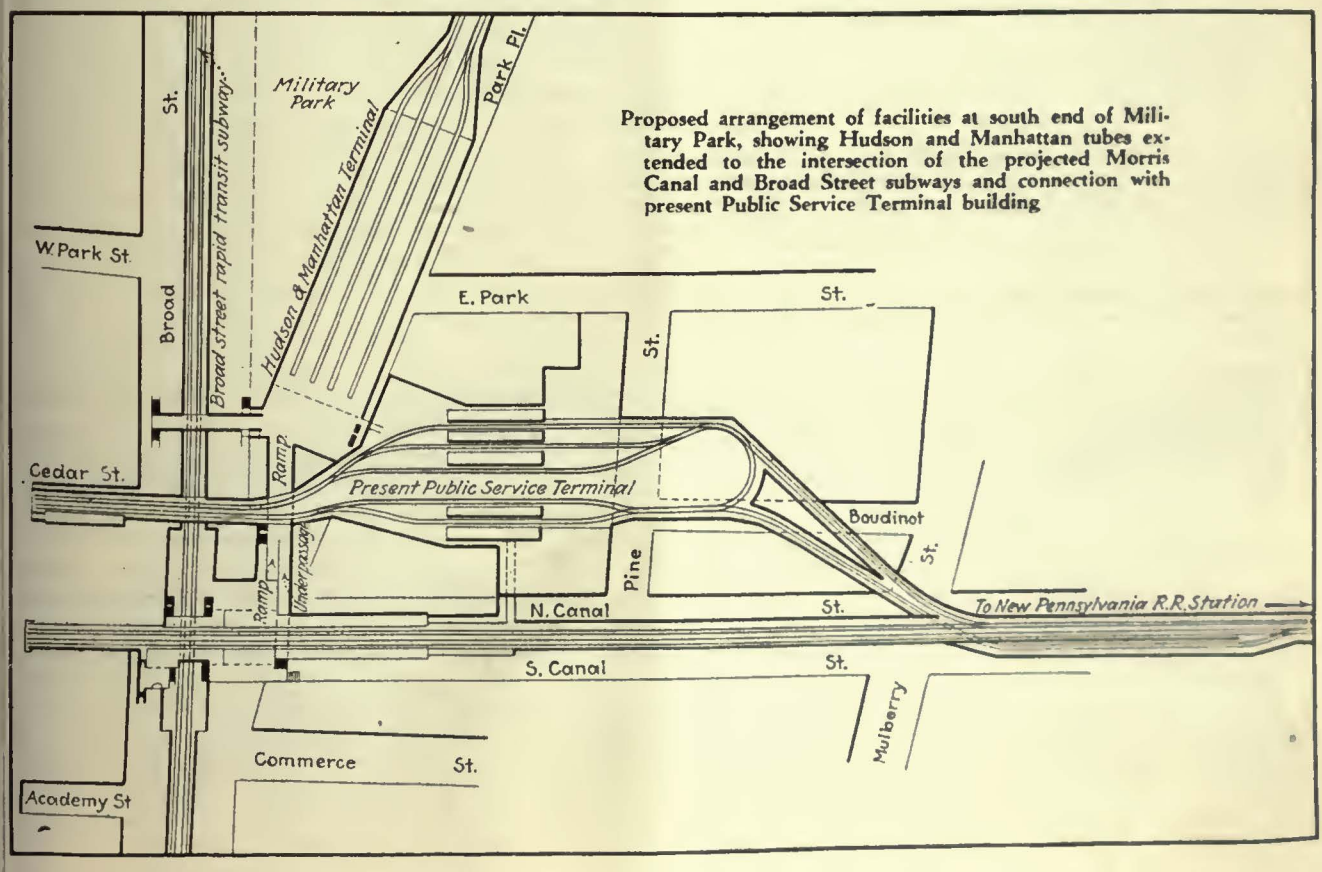
A modern subway built through the central portion of a large city is the most expensive form of construction for a rapid transit line. In certain districts, however, where street congestion and pedestrian traffic have grown beyond the capacity of the surface thoroughfare, a recourse to subways, however expensive, becomes necessary. The great cost per mile of such structures can be justified only by great density of traffic providing a revenue to support them unless the city finds it necessary to construct subways to provide convenient access to its congested districts because of the insufficient street capacity. The report points out that expenditures for a subway system must be justified as self-supporting or must produce a return to the city by increase in property values and consequent larger tax revenue. A study of the city boundaries of Newark shows that its width east and west is not great, and to tap many of the outlying districts would require extension into the territory of other municipalities. As they would participate in the benefits from rapid transit development, they should also participate in the financial burden.

Rapid Track Reconstruction in St. Louis

Widening of Olive Street necessitated the relocation of 3.35 miles of double track without interruption to service

By C. L. Hawkins
Engineer of Way and Structures
United Railways of St. Louis

DURING the past winter the city of St. Louis took possession of property condemned for the widening of Olive Street, one of the most important arteries leading into the business district, and workmen recently completed the removal of buildings from the area condemned. Double tracks of the United Railways are located on this street and the improvement necessitated extensive changes in the location of these tracks.

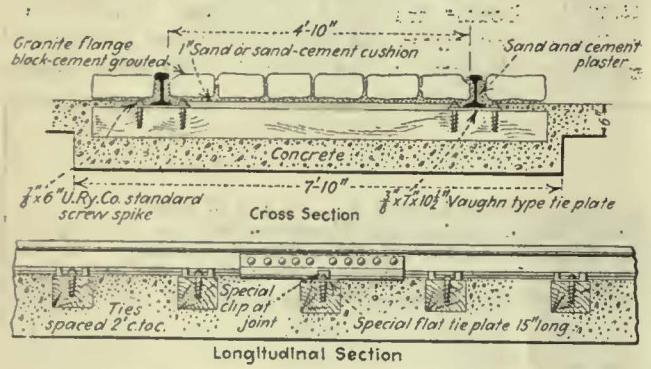


Proposed arrangement of facilities at south end of Military Park, showing Hudson and Manhattan tubes extended to the intersection of the projected Morris Canal and Broad Street subways and connection with present Public Service Terminal building

Formerly the width of the street between property lines was 60 ft. with a 36-ft. roadway and 12-ft. sidewalks. The new width of the street is 100 ft. between property lines with a 76-ft. roadway and sidewalks of the same width as before. A total length of 3.35 miles of double track was relocated at a cost of $276,250.

The tracks were of 9-in. Lorain section No. 440 rail, weighing 132 lb. per yard, laid in 1915 on 7-ft. cypress ties in solid concrete foundation laid in 1906. The rails were laid on ½-in. x 6-in. x 11-in. flat tie plates with malleable iron clips and 1¼-in. x 6-in. screw spikes, ⅞-in. round tie rods and 16-rivet Nichols composite joints. These rails carried approximately 4,000,000 cars prior to their removal, while the foundation carried approximately 6,225,000 cars. It is estimated that the rails, if

Widening of Olive Street, St. Louis, necessitated the relocation of 3.35 miles of double track of the United Railway



Granite blocks, Vaughn tie plates, screw spikes and Nichols 10-rivet joints are features of the new track laid on Olive Street, St. Louis

left undisturbed, would have been good for eight years more. After removal they will be used for minor repair work on other tracks.

New tracks were laid on a center line 20 ft. south of the old center line. This left 5 ft. between the gage line of the north rail of the new westbound track and the gage line of the south rail of the old eastbound track and permitted the construction of the new double track without disturbing the old. Rails are 100-lb. A.R.A. series "A" tee section, laid on adzed and drilled 6-in. x 8-in. x 7-ft. 4-in. white oak ties. Vaughn tie plates are used with four lugs bent down over the rail base. Spikes are ⅞-in. x 6-in. screw type. There are no tie rods. Joints are Nichols composite 10-rivet type. A solid concrete foundation is used with the concrete brought up to the top of the ties. The tracks are paved with granite blocks, flange blocks being used along the rail. The area which the railway is obligated to pave is 12 in. wide and the blocks are 12 in. long, laid at right angles to the rail.

Excavation for the southernmost or eastbound track was made with an electrically operated Thew shovel, which loaded the dirt into 5-ton Pierce-Arrow dump trucks standing on the pavement between the old eastbound track and the old south curb of the street. The contractor furnishing the dump trucks kept nine of them in service during a large part of the job and was paid for his services on the basis of yardage handled. The trench behind the shovel was finished by hand. All work on the new eastbound track was done without interference to traffic on the old double track and with little disturbance to the use of the old roadway.

Concrete in the eastbound track was allowed to set for approximately two weeks before work was started on the construction of the new westbound track. After that eastbound cars were operated over the new track and the Thew shovel began excavating a trench for the new westbound track, loading the dirt directly onto cars standing on the old eastbound track. In other respects the method of procedure was the same as for the track first built.

Work Done in the Two Nine-Hour Shifts

Two shifts of nine hours each were used on this work, the first starting at 5 a.m. and quitting at 2:30 p.m., while the second began at that hour and stopped at midnight. Work was begun on the eastbound track on June 8 and was completed, including pavement, on July 1. This work included some grading and some special work required for construction of the westbound track. Work on the latter began on July 18 and was completed, including paving on Aug. 4, making a total of 42 days for the construction of 3.35 miles of double track, or 12½ days per mile of track, including paving.

The new westbound track is located just north of the curb of the old 36-ft. roadway of Olive Street. The new eastbound track is located within the old sidewalk space on the south side of the street. While practically all of the buildings in this area were business houses, only 30 ft. of the new eastbound track is located over old cellars under the former sidewalk. In the 40-ft. strip on the south side of the street the city has kept inspectors on the scene during the wrecking of buildings to see that only clean material, free from wood, building paper and other trash was used for filling in the cellars. No clay was permitted to be used in the filling process. By this careful inspection it is hoped that a foundation has been secured that will not settle materially.

Contracts for paving the roadway outside of the railway area was let by the city on July 26. Work started soon thereafter and it is hoped that the south roadway and south sidewalk will be finished before cold weather interferes. During the construction of the south half of the street westbound cars will be operated over the old westbound track and eastbound cars will be operated over the new westbound track. This will leave the new eastbound track as a landing space for passengers and make unnecessary the construction of temporary loading platforms. The old westbound track will be out of service because portions of it must be removed to permit the installation of manholes for telephone conduits centered under the new westbound track. All conduit manholes are so built that the entrances are far enough away from the tracks to permit pulling in or out of cables without interference with the operation of cars.

The Prince of Wales and Vice-President Dawes transferring from their automobile to the Ondiara for the Niagara Gorge trip

Royalty Visits Niagara Gorge

International Railway was host to the Prince of Wales, Vice-President Dawes and others. The trip was safeguarded well by the company

WHEN his Royal Highness, the Prince of Wales, his brother, Prince George, Prime Minister Stanley Baldwin of Great Britain, Secretary of State Kellogg, Vice-President Dawes and other officials representatives of England and the United States attended the dedication of the new $4,500,000 Peace Bridge across the Niagara River from Buffalo to Fort Erie, Ont., the International Railway, Buffalo, N. Y., played the rôle of host to a large part of royalty and American statesmen on a trolley tour through the lower Niagara Gorge.

It was the first time that an heir to the British throne and a Vice-President of the United States, together with more than a score of other prominent members of the royal family and distinguished American officials, were guests of an electric traction company. They deserted their private automobiles and the royal train, which carried the British and Canadian party across the Dominion, for seven especially decorated street cars.

For two weeks previous, the International Railway had been planning every detail of the trip which started at Chippawa, Ont., and continued over the Park and River division of the company to Queenston, over the company's lower bridge to Lewiston through the lower Niagara Gorge via the Niagara Gorge Railway, up through the business section of Niagara Falls, N. Y., over the Falls View Bridge of the railway company and back again into Canada.

The photographs show interior views of two of the cars used by the royal party. The cars previously had been put through the paint shops, the seats had been removed and heavy wicker arm chairs and period furniture was installed. Oriental rugs covered the floors and

The Ondiara, private car of the International Railway, carried the Prince of Wales and his party

The Rapids, private car of the Great Gorge Route, also was used to carry the royal visitors

the cars were decorated with flowers. Arrangements had been made with a caterer to serve tea to the distinguished passengers. The trainmen were especially selected from the viewpoint of experience and appearance. Seven cars were in the procession, the first being a pilot car carrying Bernard J. Yungbluth, president of the International Railway, and other officials. The second car carried the Prince of Wales, Prince George, Prime Minister Baldwin, Secretary Kellogg, Vice-President Dawes and some of the ladies in the party.

All arrangements covering a period of two weeks were handled personally by President Yungbluth. No other traffic was allowed over the various divisions and bridges while the royal party was in transit, and there were no stops for customs or immigration inspection. At the intersection of the International local lines in Niagara Falls and the New York Central Railroad, trains were held up so cars would not be detained at the crossing.

Twenty officials and employees of the company were assigned by President Yungbluth to supervise the trip, indicating the extreme care exercised to insure the safety and comfort of the distinguished party. In addition, other men were assigned to ride the cars in the royal procession and to inspect all men in uniform. The two private cars used were the Ondiara of the International Railway, and the Rapids of the Niagara Gorge Railway. The police supervision was also arranged by the Dominion authorities, the United States Secret Service, the New York State constabulary and the Niagara Falls police, these bodies co-operated with the railway executives and there was a lengthy detailed assignment of these men to prevent any unpleasant incident. One of the photos shows Vice-President Dawes and the Prince of Wales leaving their private automobile at Chippawa to board the International Railway special car.

First Station Completed on Dorchester Rapid Transit

SIMPLICITY is the keynote in the design of the new Columbia station, the first to be completed on the Boston Elevated Railway's new Dorchester rapid transit extension. This station will serve a heavy residential district and several large industrial plants. In general arrangement it is of the "island" type. The headhouse is provided with wide doorways. It has an area of approximately 290 sq.ft. on the sidewalk level for prepayment use. The fare collection apparatus includes two General Electric automatic dime-in-the-slot passimeters and an old type passimeter located at the change booth window.

Two flights of stairs lead from the fare collection barrier to the north end of the platform, which extends 350 ft. beyond the stairs. The width of the platform varies, being 20 ft. wide at the stairs and 23 ft. at the opposite end. A feature of the design is a 4-ft. space between the platform edge and the concrete base, which not only provides a place for cables, wires, piping and other necessary equipment but serves as a refuge for track workmen when a train is approaching. A canopy with slab waterproofed concrete roof is supported by steel members and extends the entire length of the platform. Two switch rooms and toilets for the public and employees are located under the stairways, while a waiting room and station master's room are in the center of the station.

The entire structure is fireproof, being built of brick, concrete and steel. The tracks were so located as to provide for a 135-ft. extension to the platform to be built when increased traffic warrants six-car trains.

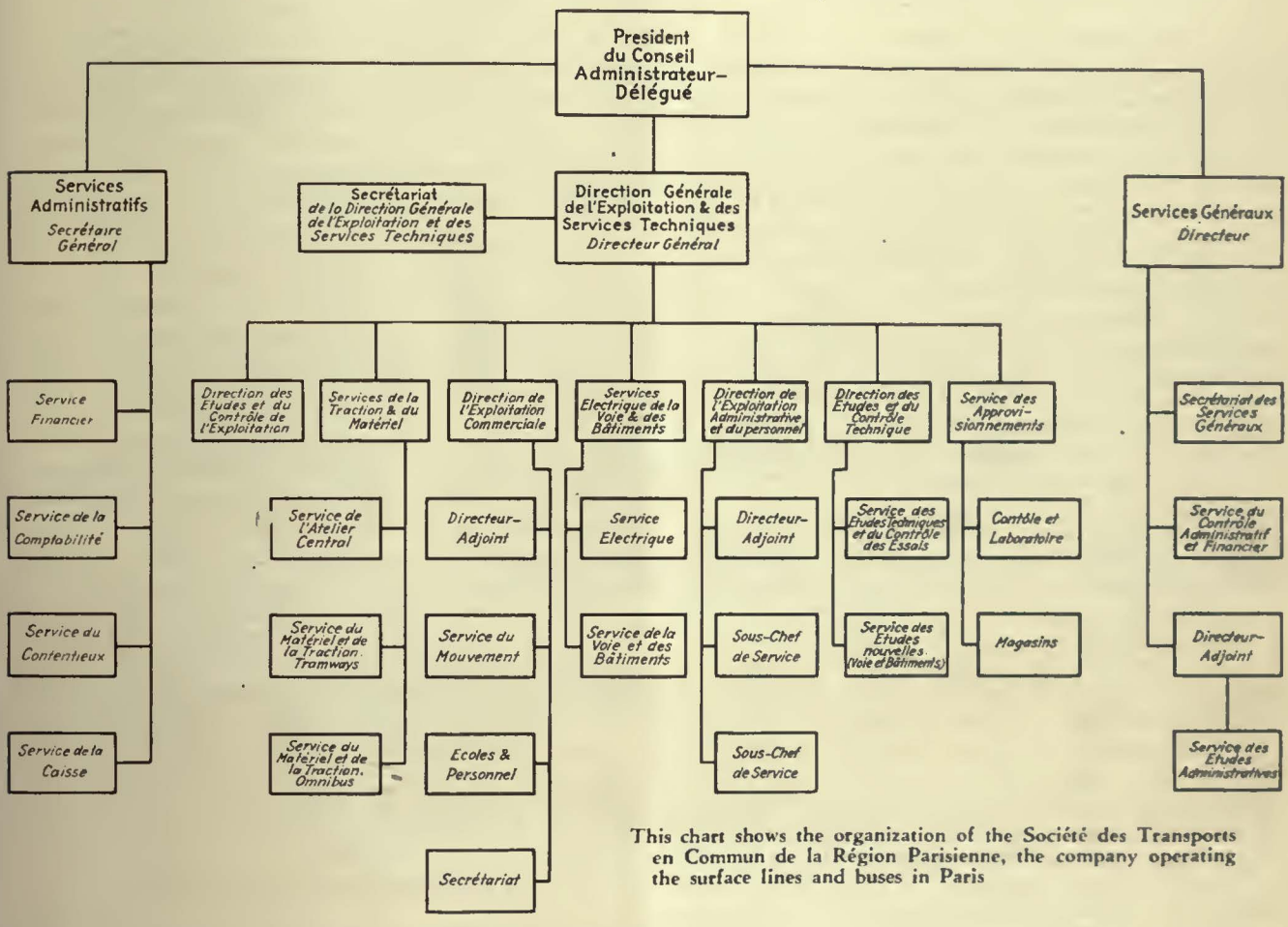
Above, Columbia station from Old Colony Railroad. Columbia Road viaduct and headhouse are on the right

At right, view of the island type station from the viaduct

How the

Duties Are Assigned Abroad

European companies have different departments and divisions than railways here. The organization chart of the Paris electric railways and bus system is analyzed



This chart shows the organization of the Société des Transports en Commun de la Région Parisienne, the company operating the surface lines and buses in Paris

ORGANIZATION of the European tramway companies differs widely from that of electric railway companies in the United States. There are more departments, and the responsibilities of the different department heads show quite a variation from American practice. To illustrate this an outstanding European company, the Société des Transports en Commun de la Région Parisienne, which operates all of the tramways and bus lines in Paris, has been selected, and an organization chart is published herewith. In this chart the titles of all of the officers and departments are given in French, as there are no exact equivalents in English for some of the titles.

This company is one of the largest in Europe, and during the ten months ended Oct. 31, 1926, it carried 858,813,055 passengers and had gross receipts of 441,416,709 francs ($17,656,668). Besides its buses and street cars, it operates a short suburban steam road and a line of boats on the River Seine.

The chief executive officer of the company is called Président du Conseil, Administrateur Délégué, corresponding to our president.

The three department heads reporting to him are the secretary general, in charge of the department of Services Administratifs; the general manager, in charge of the department of Exploitation et Services Techniques, and the manager of the department of Services Généraux.

The department of "Services Administratifs," presided over by the secretary general, is much greater in scope than that under the same officer in this country. Broadly speaking, it looks out for the corporate life and activities of the company, except that directly connected with the movement of passengers and the legal activities. Besides being responsible for the corporate records and the

preparation of the various financial reports of this company, the secretary general is the ranking financial officer of the company. This means he is in charge of all receipts from the time they are turned in at the various depots by the representatives of the transportation department. He also has charge of all purchases of material and all disbursements, such as payments for wages, pensions and insurance, and even the issue of tickets to the depots. He also attends to the sale of any property of the company and has charge of all litigation relating to claims. The officers of the company corresponding to the treasurer, stock registrar and claim agent report to him. The titles of the four subdivisions of the department of "Services Administratifs" may be translated as finances, accounts, claims and treasury.

Transportation and Engineering Department

All operating questions come under the Directeur Général, or general manager, the title of whose department might be translated as Transportation and Engineering. This department has seven subdivisions, as shown in the chart. The secretary of this department acts as liaison officer to these several subdivisions as well as attending to the duties naturally pertaining to his work. The duties of these subdivisions will be considered as they appear on the chart.

The first subdivision on the chart is Direction des Etudes et du Contrôle de l'Exploitation, which might be considered the same as our schedule department, except that there have been added to it some of the duties of a commercial research department, such as the determination of new routes, compilation of bonuses for motormen and energy-saving campaigns, and of statistics on operation.

The next subdivision, "Services de la Traction et du Matériel" corresponds to our equipment department. This department is shown in the chart to have three divisions which correspond to our (1) main repair shop (2) maintenance of cars, and (3) maintenance of buses. There are also two other departments not listed, i.e., "boats" and "steam railroad," because of the operation of these two services by the Paris company, as explained.

The next subdivision listed is that of "Exploitation Commerciale," which may be termed the transportation department, and its three divisions might be called vehicle movement, instruction and personnel, and secretarial. The first of these has charge of the movement of cars and buses in regular and extra trips, the issue of all tickets to employees and the supervision of carhouses and garages as far as relates to car movement. The second division is responsible for the training of motormen and conductors, the issue of the employees' rule book, application of discipline, safety work, study of the causes of accidents, and the issue of merchandising literature, such as posters and guides. The secretarial department has charge of the employee files and the lost and found departments, and acts as liaison officer for the other group departments.

The next subdivision might be known as the electrical and way engineering department. One of its divisions has charge of the electrical distribution, high tension and low tension, and substations. The other has charge of track and buildings, including cleaning of track and conduit and the greasing of switches and curves.

The next sub-department listed is that of "Exploitation, Administrative et du Personnel." This means a combination of the duties of an American employment department and welfare department. This department attends to the hiring of the transportation employees, the maintenance of the files of employees who have retired from the service, supervision of the benevolent funds and pensions, and the employees' medical service.

The next subdivision listed is that of "Etudes et du Contrôle Technique" and might be considered as the technical research or statistical department. Its work differs from that of the operating research department already mentioned because its attention is devoted purely to studies for the improvement of the equipment, including track and buildings. It has two subdivisions, one to cover existing equipment, the other, new work, including track.

The final subdivision of the operating department is that of "Approvisionnements," which corresponds to the stores department on an electric railway, except that it also has charge of the printed unissued tickets as well as of all fuel supplies. It also passes on all requisitions for purchases of material and orders for sales, conducts all laboratory tests required on material purchased or under consideration, and performs some other duties which are not usually undertaken by the stores department of an American electric railway.

Department of General Services

The final main department is that of "Services Généraux" or general services. This is essentially the legal department, though not including accident litigation. It has supervision of the franchise matters of the company and cares for all legal questions in relation to the franchise which may arise with the municipal authorities. It also has charge of the publicity of the company except that of merchandising literature, but including the relations of the company with the press. All of these duties are performed by the first sub-department, listed in the chart, "Secrétariat," or by the third, "Services des Etudes Administratives."

The second sub-department, or "Service du Contrôle Administratif et Financier," is essentially an auditing department, not only of accounts and inventories, but of all official orders and instructions issued so far as to see that they do not exceed the powers of the company or conflict with existing city ordinances. Where any such orders require the visé of some municipal officer, this department conducts the negotiations to obtain such approval.

Blotters Advertise Levis

These blotters effectively call attention to the beauties of Quebec's South Shore, which is served by the Levis Tramways

QUEBEC'S South Shore and its attractions are being advertised by the Levis Tramways through the distribution of blotters lithographed in color. Attention is called to the superb spots for summer residence and good beaches for bathing and canoeing only a short distance from Quebec that may be reached by tramway or by auto.

Quality Trainmen

Obtained for the Transportation Department

Los Angeles finds careful selection of trainmen greatly reduces labor turnover. About 50 new men only now required to keep force to standard size. Full particulars given of methods employed

METHODS of selecting, employing and training platform men for service on the Los Angeles Railway follow well-established lines. Careful attention, however, is paid to obtain courteous, safe operators who will create public good will. Because of favorable climatic conditions in southern California this company has large numbers of applicants for positions as motormen and conductors from which to make selections. Professional men, operators of experience and other classes of men from all over the country seek positions as platform men in Los Angeles. This abundance of applicants from which to choose has raised the standard of employment and improved the service.

Selecting the proper men centers around a few simple mental tests. No attempt is made to put a man through an extended psychological examination. His ability to react favorably to the Haggerty test, which is a modification of the army examination, is sufficient to qualify him to fill out an application blank. Failure, of course, eliminates the applicant.

The superintendent of employment gives each man a general interview outlining the work and policy of the company, after which an acceptable candidate fills out an introductory blank and is then subjected to the mental test. Tests are given Monday, Wednesday and Friday. Classes of from 20 to 25 applicants are handled, depending on the need for men at the various divisions. Results of the psychology test are recorded and forwarded through the employment department and further examination of the applicant rests upon the grade made.

The successful candidate proceeds to the employment desk, where he is given an arithmetic test which embodies simple problems of addition, subtraction and calculation. This has had its effect in weeding out applicants who are not mentally fit to make out the trip sheets and other forms of the company requiring simple calculating and arithmetic.

More Than 90 Per Cent of Trip Sheets Correct

Both systems of tests are employed at the present time, the company not having decided which type will be adopted as final. However, since the installation of the calculation test, combined with the effect of the merit and bonus system, an improvement has been noticed in the calculations made on the trip sheets Before the tests were in effect, and prior to the merit and bonus system, fully 60 per cent of the trip sheets were calculated inaccurately. Now more than 90 per cent are correct, as checked by the auditing department. In the calculation test a man is allowed twenty minutes to do the problems. Usually he takes less time than this. His grade in this test is recorded as a percentage, with the notation of the number of minutes he required to complete the work.

With the calculation test passed, the man desiring employment is permitted to fill out the application blank. On this form, shown in an accompanying illustration, the applicant must answer all questions to the best of his knowledge. On the third page of the form is an agreement between the Los Angeles Railway Corporation and the employee. A clause in this agreement says that a $1 deposit is required of each applicant for payment into the fund of the Co-operative Association of Los Angeles Railway Employees. This fund is for the purpose of covering the responsibility of all equipment furnished by the company to its employees, for uniforms purchased on installments and partially to indemnify the company against losses from wrongful acts of employees.

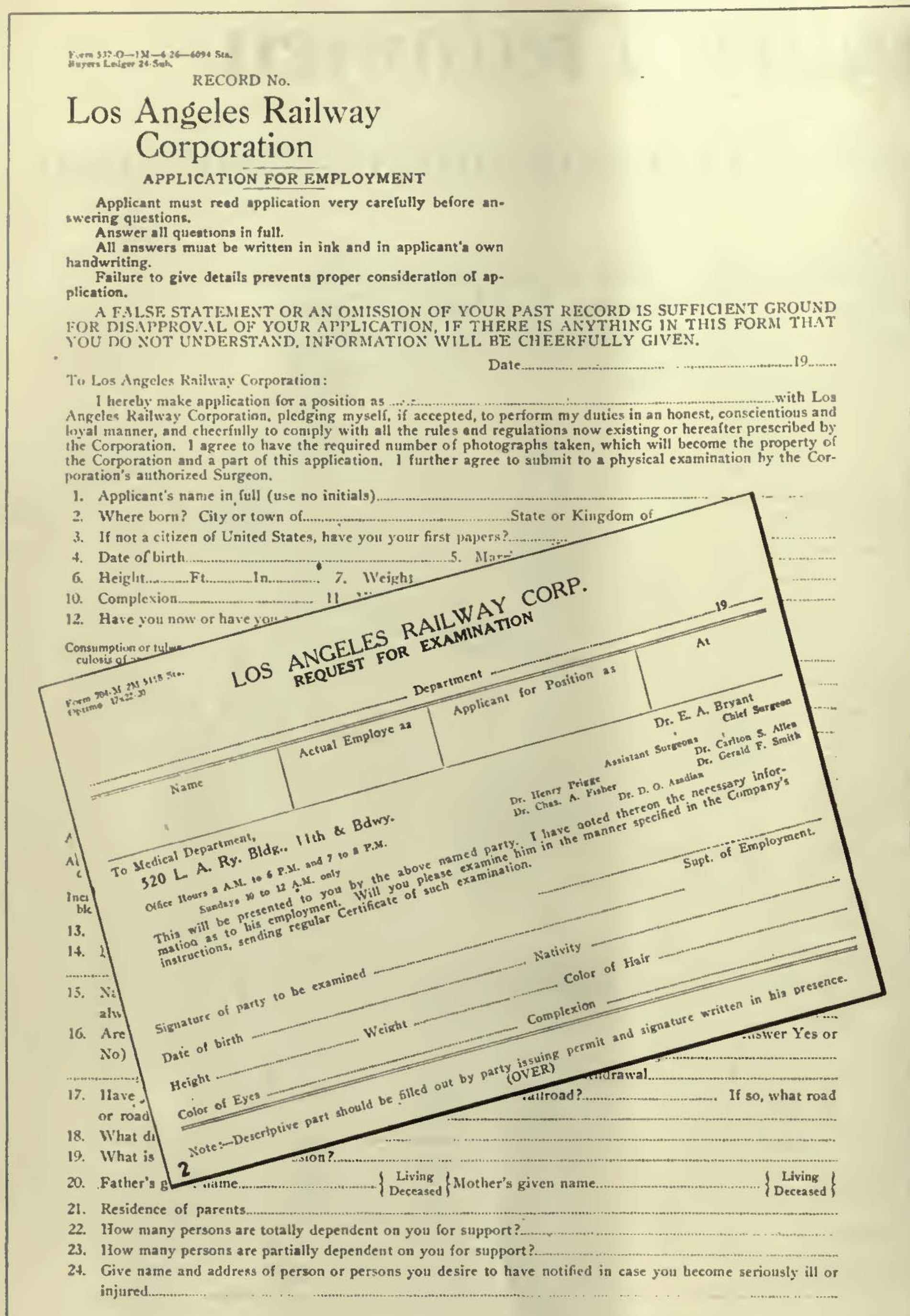
After the application blank has been filled out and checked by the clerk in charge, to see that all questions have been answered, a receipt for it is given to the applicant.

A man must be 23 years of age to qualify as conductor and 25 years of age for motorman, and he must be under 40 years of age. An exception is made to this latter qualification in the case of re-employment of men with particular qualities which make them especially desirable employees.

Applications of approximately 100 motormen and 100 conductors are kept on hand. Calls are made on these in the order of their application. The experience of the company in calling applicants for service has been that out of the 100 applications on file about 60 men are available for immediate service.

During the past four years the number of new men employed each year has been steadily decreasing. In 1923 approximately 1,600 men were engaged for employment in the train service. In 1925 this number had been reduced to about 800, and at present the employment department is handling only about 50 men per month.

Every Tuesday groups of men, as needed by the operating department, are called into the employment office to report for instruction, and, if satisfactory, for subsequent employment. At this time the men are required to pay an additional $1.85 for their caps. They are sent from the employment office to the auditor's office to



Form 537-O—1M—4 26—6094 Sta.
Buyers Ledger 24-Sub.

RECORD No.

Los Angeles Railway Corporation

APPLICATION FOR EMPLOYMENT

Applicant must read application very carefully before answering questions.

Answer all questions in full.

All answers must be written in ink and in applicant's own handwriting.

Failure to give details prevents proper consideration of application.

A FALSE STATEMENT OR AN OMISSION OF YOUR PAST RECORD IS SUFFICIENT GROUND FOR DISAPPROVAL OF YOUR APPLICATION, IF THERE IS ANYTHING IN THIS FORM THAT YOU DO NOT UNDERSTAND, INFORMATION WILL BE CHEERFULLY GIVEN.

Date.................................19.......

To Los Angeles Railway Corporation:

I hereby make application for a position as ....with Los Angeles Railway Corporation, pledging myself, if accepted, to perform my duties in an honest, conscientious and loyal manner, and cheerfully to comply with all the rules and regulations now existing or hereafter prescribed by the Corporation. I agree to have the required number of photographs taken, which will become the property of the Corporation and a part of this application. I further agree to submit to a physical examination by the Corporation's authorized Surgeon.

1. Applicant's name in full (use no initials)..................
2. Where born? City or town of..................State or Kingdom of
3. If not a citizen of United States, have you your first papers?..........
4. Date of birth..................5. Mar
6. Height.......Ft.......In....... 7. Weight
10. Complexion.................. 11
12. Have you now or have you

Consumption or tuber-culosis of

13.
14.
15.
16. Are ... answer Yes or No)
... withdrawal.......
17. Have ... railroad?............ If so, what road or road
18. What d
19. What is ... sion?
20. Father's given name..........{ Living / Deceased } Mother's given name..........{ Living / Deceased }
21. Residence of parents..................
22. How many persons are totally dependent on you for support?..........
23. How many persons are partially dependent on you for support?..........
24. Give name and address of person or persons you desire to have notified in case you become seriously ill or injured..................

1

Form 704-M 2M 5158 Sta.

LOS ANGELES RAILWAY CORP.

REQUEST FOR EXAMINATION

..........19......

At

Department

Applicant for Position as

Actual Employe as

Name

Dr. E. A. Bryant, Chief Surgeon

Assistant Surgeons: Dr. Carlton S. Allen, Dr. Gerald F. Smith, Dr. Henry Peigge, Dr. Chas. A. Fisher, Dr. D. O. Aadian

To Medical Department,
520 L. A. Ry. Bldg., 11th & Bdwy.
Office Hours 8 A.M. to 6 P.M. and 7 to 8 P.M.
Sundays 10 to 12 A.M. only

This will be presented to you by the above named party. I have noted thereon the necessary information as to his employment. Will you please examine him in the manner specified in the Company's instructions, sending regular Certificate of such examination.

Supt. of Employment.

Signature of party to be examined .... Nativity ....

Date of birth .... Weight .... Color of Hair ....

Height .... Complexion ....

Color of Eyes ....

Note:—Descriptive part should be filled out by party issuing permit and signature written in his presence.

(OVER)

2

No. 1. The application blank, which is a four-page folio, requests detailed information. The third page contains a working agreement between the corporation and the employees

No. 2. The medical department fills out this form at time of examination

make this deposit and from the auditor's office to the tailor shop, where the cap is issued. A medical examination is given at the time the application is made, so that there will be no delay in placing the man in the school of instruction if he is satisfactory in other ways. Also, at the time of medical examination, the applicant is told about the medical service which is given on a co-operative plan by the company. Trainmen who pay a fee of 50 cents per month are entitled to medical attention, advice and treatment. The company pays an additional 50 cents per month for each man in order to maintain this service.

The order in which the applicants return from the auditor after depositing the money for their caps determines their seniority for the term of employment with the company. After all have reported back to the employment office they are given their first course of instruction.

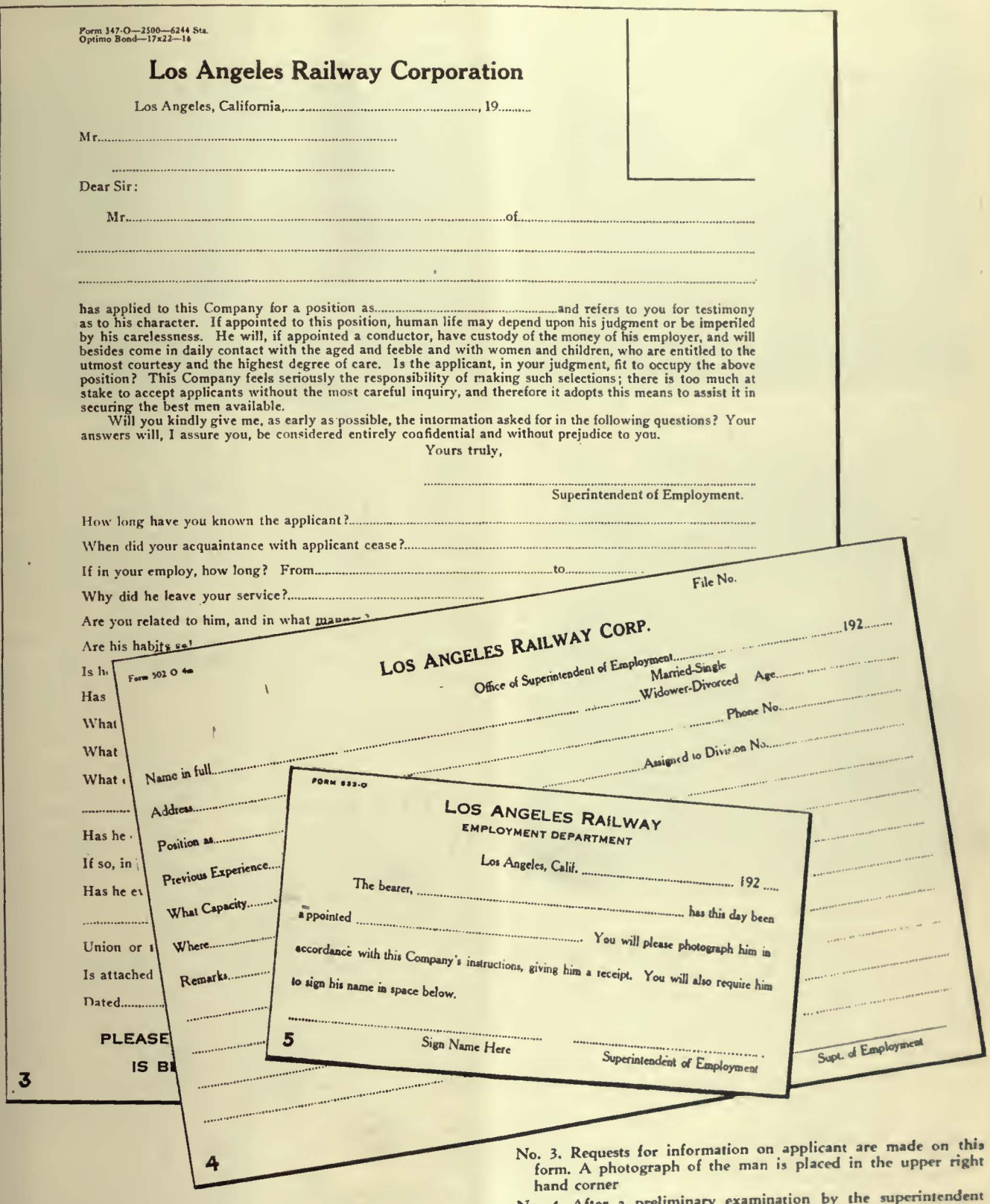
Instruction by Class and Road Work

Classes for instruction are held two days a week at twelve noon. The superintendent of instruction outlines the prospective work for the men, stressing the disagreeable features as much as possible. After his preliminary lecture and at several times during the course of instruction he gives those who do not care to go on with the work an opportunity to leave. About 12 per cent of the men leave for one of four causes: Resignation, falsifying of application, general slowness and insubordination.

At the preliminary instruction the men are told that if they qualify and are employed they will receive $2 a day for the instruction period. After that they will receive the regular wage scale with a guarantee. The course of instruction varies with the man. For some it requires only two days; with others fourteen, being shorter for conductors than for motormen. After the first day of class instruction the men are divided into groups, the student conductors being taken by the conductor instructor and informed of their duties.

The motorman instructor takes the class of student motormen to the instruction car, where the main instruction is given. Two cars are used for this work. Both are of a rather old type, but one which naturally would be used by a new trainman on a tripper run. Four days are spent by the class of motormen on the instruction cars. The first day is spent with the car in the yard. On the second day the motorman instructor runs the car out of the yard and over one of the lines of the division, showing the new men the operation of the controller and air brake and calling their attention to conditions along the line.

In the yard work the student is taught to keep his head up while at the controller. Each man is given a chance, the instructor permitting him to try to master



Form 347-O—2500—6244 Sta.
Optimo Bond—17x22—16

Los Angeles Railway Corporation

Los Angeles, California,....., 19.....

Mr.....

.....

Dear Sir:

Mr.....of.....

.....

.....

has applied to this Company for a position as.....and refers to you for testimony as to his character. If appointed to this position, human life may depend upon his judgment or be imperiled by his carelessness. He will, if appointed a conductor, have custody of the money of his employer, and will besides come in daily contact with the aged and feeble and with women and children, who are entitled to the utmost courtesy and the highest degree of care. Is the applicant, in your judgment, fit to occupy the above position? This Company feels seriously the responsibility of making such selections; there is too much at stake to accept applicants without the most careful inquiry, and therefore it adopts this means to assist it in securing the best men available.

Will you kindly give me, as early as possible, the information asked for in the following questions? Your answers will, I assure you, be considered entirely confidential and without prejudice to you.

Yours truly,

.....

Superintendent of Employment.

How long have you known the applicant?.....

When did your acquaintance with applicant cease?.....

If in your employ, how long? From.....to.....

Why did he leave your service?.....

Are you related to him, and in what manner?

Are his habits se

Is h

Has

What

What

What

Has he

If so, in

Has he e

Union or

Is attached

Dated.....

PLEASE

IS B

3

Form 502 O 4m

LOS ANGELES RAILWAY CORP.

File No.

Office of Superintendent of Employment..... 192.....

Married-Single
Widower-Divorced Age.....

Phone No.....

Assigned to Division No.....

Name in full.....

Address.....

Position as.....

Previous Experience.....

What Capacity.....

Where.....

Remarks.....

Supt. of Employment

4

FORM 822-O

LOS ANGELES RAILWAY

EMPLOYMENT DEPARTMENT

Los Angeles, Calif. ..... 192 .....

The bearer, ... has this day been appointed ..... You will please photograph him in accordance with this Company's instructions, giving him a receipt. You will also require him to sign his name in space below.

.....

Sign Name Here

.....

Superintendent of Employment

5

No. 3. Requests for information on applicant are made on this form. A photograph of the man is placed in the upper right hand corner

No. 4. After a preliminary examination by the superintendent of employment, this form is filled out to serve as an introduction to the testing department

No. 5. Order on photographer to have applicant's picture taken. A copy of the photograph is sent with each reference inquiry

the sequence of operations before permitting another to practice. Imaginary starts and stops are made, the instructor giving the bells while a student operates the handles. With a car out on the line the instructor permits first one student and then another to run it, making starts and stops to pick up imaginary passengers. This preliminary instruction work lasts four days. In addition, for two nights the students must operate the car under the guidance of an instructor during the evening hours. If on the fourth day the student is not bewildered by the downtown traffic, nor has become confused in an emergency, he is considered qualified for further instruction on a regular run with a line instructor.

Final training of the student is handled individually by line instructors who operate out of the various car-

houses. They are men picked particularly for their ability, and for this work they are paid $1 per day extra. Runs on which line instructors teach motormen are particularly long and cover the greatest amount of territory. About seven such runs are taken out of each division, this amounting to approximately 20 per cent of the number. The student reports to the line instructor and stays with him until the work is completed, taking a different run each day, so that at the end of eight days the division has been covered by the instructor and student. As there is not enough training to go around, the work is rotated so that all instructors are assigned to part of it.

Vacancies in the operating department supervisory positions are filled from the group of line instructors. This system is designed to anticipate the future approximately five years, when openings will occur in the operating department which of necessity must be filled from the rank and file of the organization. Since this system was begun two years ago seventeen men have been promoted to supervisory positions. At the time a line instructor qualifies for such a position he is asked what particular work in the department appeals to him and what position he would accept. This statement is placed on his qualifying papers and when an opening occurs he is asked if he cares for the position.

Conductors are instructed for about eleven days by an operating conductor instructor. They are taught how to make out trip sheets and the various forms required. This work is supplemented by outside instruction on the car under the supervision of a line instructor similar to that done in the case of the motormen.

On Probation for Three Months

While under the line instructors on the cars both conductors and motormen are subject to additional quizzing by other line instructors. Those who show aptitude are pushed through the course more rapidly. After qualifying with the line instructor, the student is turned in to the division headquarters as ready for work. His name is placed at the foot of the extra list, and from then on he becomes a regular employee of the company. For 90 days from starting the instruction work the new man is on probation. Three months after the probation period is up he comes under the merit and bonus system and is entitled to receive $5 per month bonus for efficient operation.

While on probation the new man is given additional training by traveling instructors, two of whom operate out of each division. These men call attention to infraction of rules or improper handling of equipment.

As a rule they do not report such lack of efficiency to the operating department, but make the correction on the spot and stay with the student until he has overcome the difficulty. However, instructors do make reports of inefficient operation of regular trainmen. These reports have their effect on the trainman's efficiency record, upon which is based the bonus system.

Particular attention is paid to instruction in energy saving. A watt-hour meter is carried on each car, its use is explained to the new man and he is taught how he can best operate the car to reduce the energy consumed.

After 90 days of service the new trainman returns to the instruction department for four hours of lecture work. These groups are made up of practically the same men who formed the student instruction class.

No attempt is made in the course and during the subsequent car work under the line instruction to teach the student the details of equipment and how it operates. The principle has been to give the men one thing to assimilate at a time and gradually to work up to the more complicated details of motor control and train operation. At the South Park shop is located an instruction room fitted with both the K and H-L types of control and a complete layout of air lines. Groups of motormen on probation are given instruction on this apparatus so that they will be familiar with the mechanical operation of their equipment. It is not the intention to make mechanics out of them, but each man must be able to make minor adjustments on the road in order to cut delays to a minimum.

Instruction Is Continued to Trainmen

After a man is definitely started in the regular train service his instruction does not stop. Meetings are held every other month, at which a representative of the supervisory force, the superintendent of operation, his assistant, or some other company executive, addresses the men at the various divisions on the matter of safety, courtesy and efficient service.

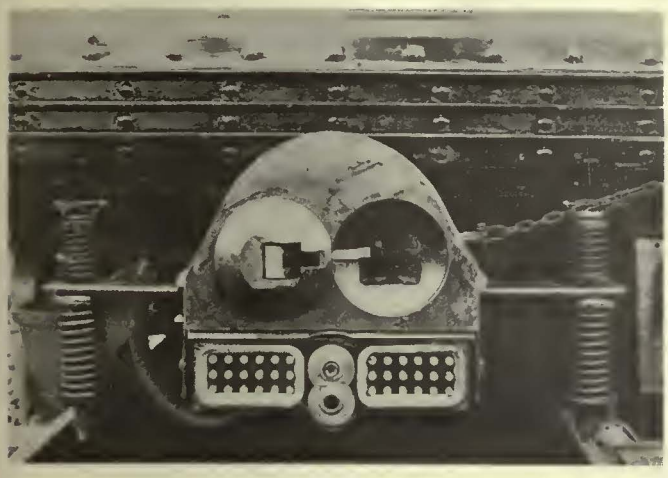
Three talks are given on each particular day to each division. This permits the attendance of men who work at various hours. On alternate months questionnaires are sent to the men, with the request to return the answers to the division superintendent within a specified time limit. All of these questions relate to operating problems and the answers should be known to each trainman. At the lecture these questions are gone over in a general way and additional information given to the men on any point which, through their answers to the questionnaires, they have indicated lack of knowledge.

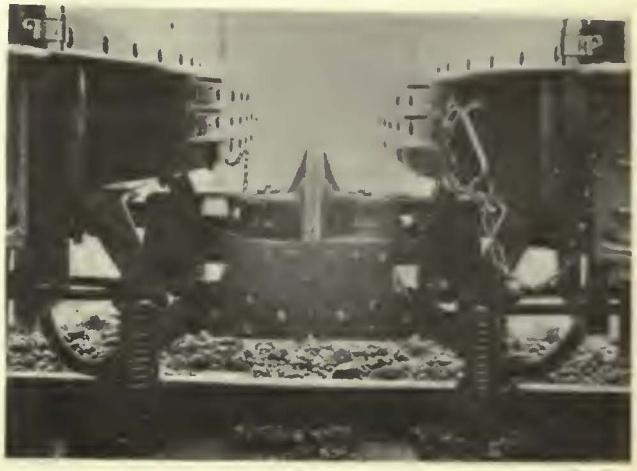
Gray Line Shows Missourians

WHILE Kansas City keeps growing in numbers and in industries, opportunity is not lacking to interested residents and inquiring visitors for acquaintance with that section of the country bounded by the fertile valleys of Missouri and the wheat fields of Kansas. Seeing Kansas City via the Gray Line is an education no less inspiring than instructive. So thorough has been the survey for sightseeing possibilities that now no fewer than seven tours are being conducted by the Gray Line, operated by the Kansas City Public Service Company in Greater Kansas City. Considering this is the initial attempt of the company into the sightseeing business, the tours are doing remarkably well. Many interesting trips can be made by street car or motor coach, the routes of which traverse every section of both Kansas City, Mo., and Kansas City, Kan., extending as far east as Independence, Mo. The Montgomery Ward and Sears-Roebuck plants, the famous Country Club residential section, well-known boulevards and parks and the industrial districts are all reached by one or more of the tours.

These places of interest are described very alluringly in a twelve-page illustrated pamphlet containing map and all necessary details as to price, time consumed on each trip, length of tour and historic points of interest covered en route. In addition suggestions are made to prospective picnic parties for the chartering of coaches, to parties desiring to spend a day on the golf course and to travelers seeking a sightseeing itinerary in other cities.

Hamburg Elevated Develops Automatic Combination Coupler





At left, front view of coupling; at right, side view of coupling

COMBINATION of the functions of a car coupler and methods of connecting the air pipes and electrical conductors has been accomplished in an automatic coupler by the Hamburg Elevated Railway, Hamburg, Germany. A number of the cars have been equipped with this coupler, and its use is being extended to the rest of the equipment. The car coupler is above and the electrical and air couplers below, and the latter are protected by a cover which automatically swings upward and back when the coupling takes place. The operation of the car coupler is well shown in the five line engravings.

Fig. 1 is a plan view of adjoining couplers on two cars about to be coupled. In each end there is a link attached within the housing to one side of a sort of triangular plate, pivoted in the center and held by a spring in the position shown. On the side of this plate opposite to the link is a notch over which the link on the other coupler slips.

Fig. 2 shows the action of these plates as the cars come together, the triangular plates turning, so that each link slips into its proper notch. When the faces of the couplers are together the springs draw the plates to the position shown in Fig. 3.

Uncoupling is accomplished by a chain which, when pulled, throws the plates into the position shown in Fig. 4, releasing both links. The triangular plates then return to their original position, the first to do so being the one whose chain has not been pulled, shown as the one at the left. Its link then slides further into the housing of the other car, and remains in the position shown in Fig. 5, until the cars part. Then the second plate returns to its original position.

Coupling with protective cover down

The principal feature of the electrical and air portions of the coupler is the sliding cover shown in the third halftone engraving below the car coupling portion of the coupler. This cover, which is pivoted, revolves up and back through the action of the triangular plate, already mentioned, when coupling is to take place.

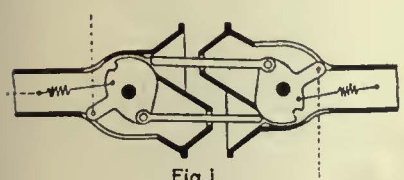


Fig.1

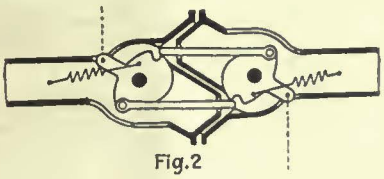


Fig.2

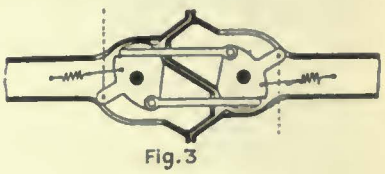


Fig.3

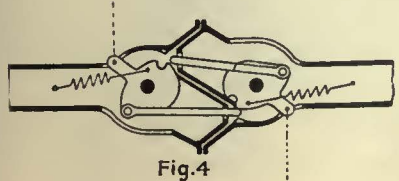


Fig.4

Automatic car coupling operates by double link

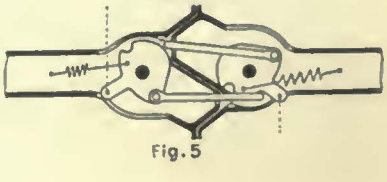


Fig.5

Valves keep the pressure air pipe closed except when the cars become coupled, and a special electrical switch near the controller in the motorman's cab provides the necessary connections for cutting out any disabled car, making the circuits dead at the time of coupling or any other connections desired.

The car coupling portion of the coupler described is known in Germany as the Scharfenberg type. The electrical and air connection portion of the coupler was developed by the engineers of the Hamburg Elevated Railway.

Calculating Rail Tonnages by a Lightning Method

By Edward A. Roberts
Of Fisk & Roberts, Consulting Engineers, New York

MOST of us have gazed in amazement at so-called lightning calculations as the demonstrator deftly solved an intricate problem of arithmetic by some apparently absurd twist of his numbers. Later study always showed that a definite law of mathematics, and not magic, supported the lightning calculation.

Such a method of calculating the number of gross tons of steel in any given length of railroad has been developed by this organization to simplify the hundreds of calculations that are necessary in making an appraisal of a railway property. For example, consider this problem:

> How many gross tons of steel (2,240 lb. to the ton) are there in a stretch of 33.11 miles of single-track railroad built of rail of 70-lb. section (70 lb. to the yard)?

Now to figure that without a handbook means, first, to convert the miles into yards, multiply by 70 to get pounds and divide by 2,240 to get gross tons. Then the answer is wrong because you forgot to multiply by two on account of single track consisting of two rails. The lightning method of getting the correct answer is this:

Write down the number of single track miles	33.11
Write it down again, one space to either the right or the left	33.11
Add the two, setting the decimal point one place further right	3,642.1

The exact number of gross tons of steel in the section of 33.11 miles of single track constructed of 70-lb. rail is 3,642.1. This method is infallible and gives the correct weight to the last ounce.

It is unnecessary to remember whether the second entry of the number of miles is set to the right or the left of the first number. The answer is the same, of course, whichever way the second number is set down. For example:

33.11	33.11
33.11	33.11
3642.1	3642.1

This method of calculating the weight of 70-lb. rail will give the correct answer for any length of rail under the sun. No magic has been used in selecting the particular mileage used in the illustration.

The above method, to be sure, does apply only to calculations involving 70-lb. rail. It can be adapted readily, however, to many other standard rail sections with a simple modification, particularly to 56, 60, 80, 84, 90 and 105-lb. sections. This modification consists of adding to or subtracting from the result obtained above the proportion represented by the difference in weight between 70-lb. rail and the desired rail section. A 105-lb. section is 50 per cent heavier than a 70-lb. section, and the complete calculation becomes:

	33.11	miles of single track
	33.11	
Divide by 2	3642.1	gross tons of 70-lb. rail
Add	1821.05	
Total	5463.15	gross tons of 105-lb. rail

Just one more typical application to a different weight of rail, in this case 80 lb. to the yard:

	33.11	miles of single track
	33.11	
Divide by 7	3642.1	gross tons of 70-lb. rail
Add	520.3	
Total	416.24	gross tons of 80-lb. rail

The reason for dividing by 7 is that 80-lb. rail is one-seventh heavier than 70-lb. rail.

This method of calculating rail tonnages is particularly applicable to field work and to calculations made without the assistance of handbooks and prepared tables of weights. On account of its simplicity it can readily be remembered.

The underlying principle is so extremely simple that it will not be stated here. Those who are interested enough to test the application of the method will enjoy discovering why it is absolutely infallible.

Careful Organization Makes Big Bus Excursion Successful

MORE than 1,200 passengers, members of a large benevolent association, were carried on July 28 on a 108-mile excursion without a single mishap by 56 buses of the Public Service Transportation Company, a subsidiary of the Public Service Corporation of New Jersey. The buses started from Newark at 8 o'clock in the morning and followed a route through Elizabeth, Rahway, Perth Amboy, South Amboy and Red Bank to Asbury Park. Each driver was supplied with a typewritten description of the route to be followed. The first bus arrived at its destination at 11:15. A five-minute stop was made at Morgan, about half-way, where the buses pulled in at a prearranged parking space alongside the road. Returning, the buses left Asbury Park at intervals between 6 and 8 p.m., and the last bus reached Newark about 11 p.m.

All buses were 31-passenger gas-electrics. They were operated in groups of five, each group being designated by a letter and each bus by a number. These designations were placed on placards outside the vehicle for purposes of identification. A supervisor was assigned to each group of buses, riding on the last one of the group. The headway between groups was five minutes. How well this was maintained is indicated by the accompanying reproduction of a headway check taken along the route.

An extra bus was assigned to every third group. This carried no passengers, but was driven by a mechanic. At the rear of the entire procession was a service truck. The only trouble which developed during the entire excur-

sion was a flat tire. Passengers on the bus which developed the flat tire transferred to the next empty bus which came along. The mechanic then replaced the tire with a spare and soon caught up to the procession again.

Parking was arranged for several days in advance. Two men had been sent down an hour beforehand to complete the necessary arrangements. Buses were stored in a large lot on Ocean Avenue. This was measured off by the advance agent and markers placed denoting the position to be occupied by each group of buses. Two car cleaners accompanied the excursion and cleaned out the buses while the passengers were amusing themselves at Asbury Park.

Above — Start of the excursion from Washington Park, Newark

At left—The headway check shows close adherence to schedule on big bus excursion

Below — Some of the 56 buses parked in a vacant lot near the beach

PASSENGER COUNT (Rifle)

TAKEN AT CHESTNUT ST & ST GEORGE AVE

JUNE JULY 28 1927 EXCURSION BUSES LINE

To						Asbury Park				
		BOUND						BOUND		
Bus	Train	AM Time Arr	Pass.	Seats		Bus	Train	Time	Pass.	Seats
5506		9.00	Full	30		2522		10.09	Full	
5508		"	"			2543		"	"	
5511		"	"			506		"		
5507		"	"			596		10.16	"	
5509		"	"			2126		.16	"	
121		9.17	Full			2220		10.19	Full	
543		9.20	"			2165		"	"	
129		"	"			2135		"	"	
2001		"	"			536		"	"	
2043		"	"			2127		1022	"	
15		9.22	Full							
74		"	"							
2229		"	"			44	Buses			
22		"	2	←						
206		"	Full			2	Extras			
183		"	"							
103		9.27	Full			1760	Pass			
106		"	"							
131		"	"							
105		930	Full							
111		"	"							
264		9.39	Full							
96		"	"							
445		"	"							
588		"	"							
618		"	"							
599		9.49	Full							
592		"	"							
469		"	"							
90		"	"							
339		"	"							
597		"	3	←						
453		951	Full							
128		"	"							

SIGNED R. KUHNEN

Long Island Cars 100% Steel

ONLY cars of steel construction will be operated for the transportation of passengers on and after Saturday, September 10, according to an announcement made by the Long Island Railroad management.

Early this year the board of directors authorized the purchase of a sufficient number of steel passenger cars to replace every remaining wooden passenger car by the end of 1927. The rapid delivery of these new steel cars makes it possible to remove all the wooden cars in service, sooner than was anticipated by the company.

With the acquisition of nearly 250 steel passenger cars during 1927, at a cost of approximately $5,000,000, and the retirement of 135 remaining wooden cars, the Long Island takes rank as the first Class I railroad in the United States to place its passenger carrying equipment on a 100 per cent steel basis.

Each bus carried a combination letter and numeral designation

Excursionists leaving bus parking area at Asbury Park

The Readers' Forum

Traffic Control Must Be Fitted to Needs of Particular Situations

CHICAGO SURFACE LINES
CHICAGO, ILL., July 14, 1927.

To the Editor:

It is hardly safe to generalize too much concerning any of the features of signal control of traffic. In general, the short cycle speeds up traffic movement, as stated in the editorial which appeared in ELECTRIC RAILWAY JOURNAL July 30, but we must remember at all times that the setting of a signal system to a given section of street is an engineering job wherein the length of cycle, the time given to the cross-streets, the speed of movement, system of signals, the control of turns or the handling of other special features should be made appropriate to that particular section. It is no more appropriate to use stock methods of handling traffic than it is for an architect to draw on stock plans from his cabinet, regardless of the requirements of his client or of the location on which a building is to be built. Approximately correct results can sometimes be achieved by such treatment, but best results are obtained only by careful study.

If signal control is to be used at a single intersection, the traffic at that intersection will be delayed the least if changes come frequently instead of having a long cycle in operation. Traffic arrives at single intersections in a somewhat uniform volume per ten-second intervals. A driver, however, can slow down slightly when approaching an intersection that has a traffic light set against his movement, so as to arrive at that intersection after the light has changed to green. If the cycle is short few vehicles will be standing still waiting for the light to change. When it does change those vehicles standing and those that are moving slowly to approach will cross the intersection quickly, leaving an open space behind them. Then if the light changes promptly for the other direction the next wave of vehicles will form in a similar way and the intersection will be used actively all the time without much wastage and with only short delays to the vehicles.

When the control is a part of a system, it is advantageous to avoid stretching out the group of vehicles that moves through together, and rather to keep them in reasonably compact form so that each portion of the green light may have its proper and uniform quota of vehicles. If either vehicles or pedestrians on the cross street are held too long there is developed unnecessary impatience and needless delay. It is possible to make much more uniform flow of traffic with short cycles than with long ones.

The length of cycle should have a definite relation to the speed and the distance between cross streets, and it is also influenced by the interference that is occasioned by the kind of turns permitted, the volume of pedestrians, the physical handicaps to free movement of vehicles at a given intersection such as street offsets, restricted widths of lanes, improper contour of paving and sharp curb corners. Sometimes the cycle may be either of two lengths which will differ considerably, such as either 60 seconds or 100 seconds. In one instance where these two cycles were tried they gave substantially the same speed, but one gave greater street capacity than the other, because the longer of the two permitted longer movements at intersections where handicaps to movement prevent a reasonable number of vehicles passing through under the short cycle.

Conflicts at troublesome intersections are sometimes aggravated with too frequent changes. For example, in our recent check of the effect of a 75 second cycle as compared with an 85 second cycle in the heaviest evening rush hour on Wabash Avenue, we found that due to both right turns and left turns for vehicles and almost capacity use of the street, the number of vehicles in one block waiting for the green light in the next intersection ahead could not pass through that intersection on the shorter cycle. With the longer cycle and less frequent changes the vehicles and street cars could pass through the loop with fewer missed lights. On the streets more lightly used, such as Clark Street, the shorter cycle with more frequent changes permits each block to be made in a shorter time, and therefore a greater speed was attained by each street car or vehicle.

It is the desire to avoid an appearance of inertia of traffic and to permit a group or wave of vehicles to pass through a street with the fewest number of stops that has led the users of synchronously controlled systems to adopt longer cycles, and having got the mass in motion, to keep it in motion as long as seemed tolerable for the cross traffic. However, the co-ordinated control breaks this traffic up in smaller groups by frequent changes in signals at the entrance to the system, and then so arranges the signals that these vehicles once started may keep on traveling without the waste that comes from stopping the group and then starting it again.

E. J. McILRAITH,
Staff Engineer.

Kansas City Cars Handle Record Crowd

THE Kansas City Public Service Company handled the largest crowd in its history on Friday night, Aug. 5, at the motion picture party of the Kansas City *Star*. Sixty thousand people attended the first showing in Kansas City of "The Rough Riders," and of this number only about one-tenth could find parking space for their automobiles. The remainder were transported by street cars. Thousands used their cars to approach as near as possible to Muehlebach Field and rode the rest of the way on the street cars.

Early in the evening 75 extra cars were placed on the Brooklyn and crosstown lines leading to the field. Within an hour this had to be increased until the company had 300 extra cars transporting the greatest single-event crowd in Kansas City's history. There were no traffic jams. Motorists were not allowed to park between 18th and 21st Streets, the region of the field.

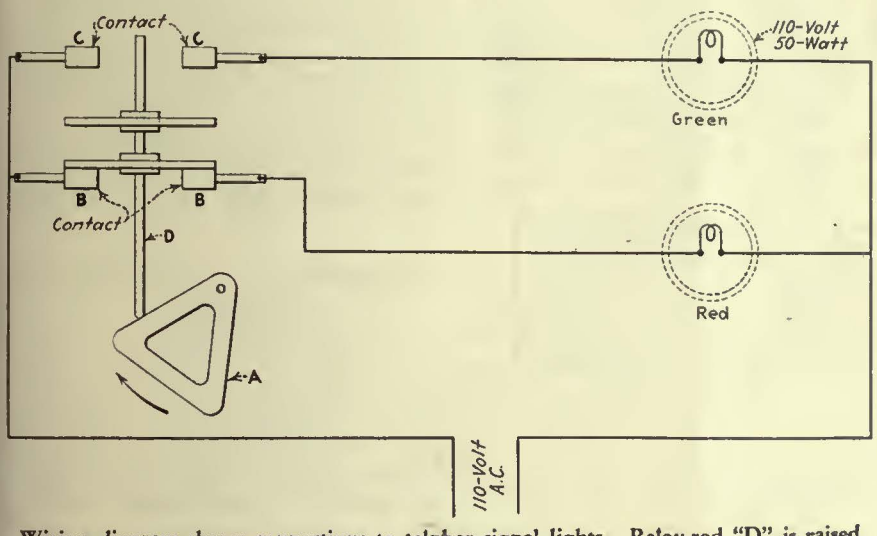
When the performance was over the 60,000 people were removed by the street cars in an hour and ten minutes without trouble. The crowd moved quietly, and outside the field D. L. Fennell, general superintendent of transportation for the Kansas City Public Service Company, had a string of 300 cars, standing fender to tail light from 31st Street to 10th Street. Extra lamps strung around the field by the company flooded the neighborhood after the show ended and enabled the vast crowd to reach the street cars with ease and rapidity. The company had 141 employees on foot between 18th and 31st Streets in directing and expediting traffic.

Maintenance Methods and Devices

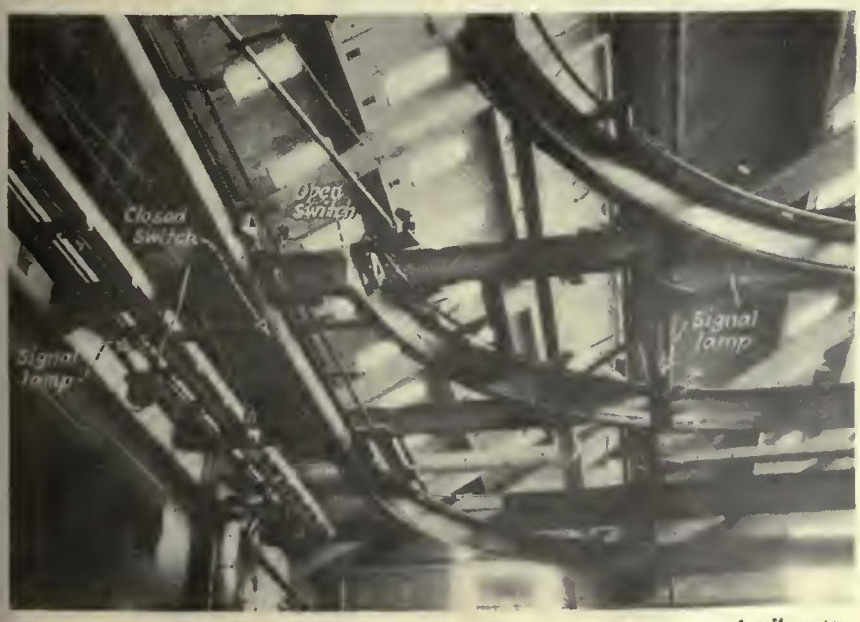
Signal System Prevents Telpher Derailments

WHERE a number of telpher cranes are operated at a high rate of speed and where switches are constantly being thrown from one rail to another there is a possibility of derailment due to running through an open switch. To minimize this danger the Interborough Rapid Transit Company of New York developed and installed a simple signal system which automatically protects an open switch with a red light and gives the right of way to the closed switch with a green light.

The telpher switches are operated by hand and when opened or closed come in contact with a safety stop which is connected through a movable arm to a set of interlocks controlling the red and green signal lamps. With the safety stop "A" in the position shown in the sketch the red light is in operation, indicating that the switch is open. When the switch is closed stop "A" moves upward as indicated by the arrow, moving the relay arm "D" upward, closing contact "C" and opening contact "B." This puts the green light in operation and extinguishes the red signal.



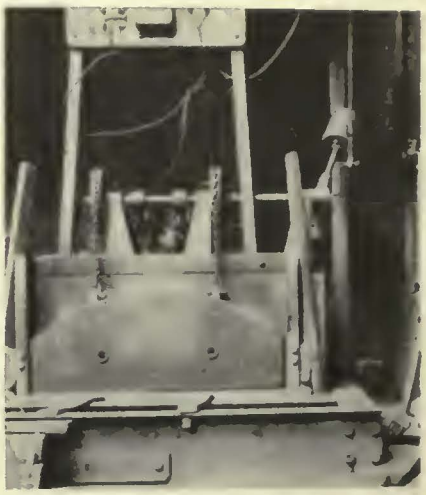
Wiring diagram shows connections to telpher signal lights. Relay-rod "D" is raised or lowered by operation of safety stop "A"



Simple signal system on telpher tracks in Interborough shops prevents derailments

Electrically Controlled Gas Oven for Heat Treatment

ONE of the most convenient parts of the equipment of the shops of the London County Council Tramways, London, England, is an electrically controlled gas oven for heat



This automatically regulated heat treatment furnace has been found very convenient for tires, brake riggings and similar parts

treatment of tires, brake rigging and other parts for which such treatment is suitable. Its advantage is that they can be left in the oven without fear of injury as the temperature cannot rise above the predetermined temperature. The automatic control is obtained by a thermocouple which actuates the regulator admitting gas and air into the furnace. Another feature of the furnace is that when the door is raised the gas is shut off automatically so that there is no burst of flame. These features make the equipment much easier to handle.

Incidentally, it might be said that all steel tires on this tramway system are now being refinished by grinding, rather than being turned on a lathe. This method is found to give a great saving in material over re-turning, the saving amounting each year to about 300 tires.

There is also a saving in time, as one grinder can finish twelve pairs of wheels a day as compared with five or six pairs a day turned on a lathe. Axle fits are also now being ground instead of being turned. An improvement in brake rods recently introduced has been the repair of broken rods by butt welding by

the electric transformer method rather than by forging. Since the introduction of the electric butt welding machine for this and other work for which it is adapted it has been possible for the shops to shut down two smithies with six men.

Wooden Gear Cases Are Used in London

ON ALL of its motor equipment the London County Council Tramways of London, England, is using a wooden gear case made in its own shops, for which a number of advantages are claimed. One advantage is that it is lighter than a steel case. A second advantage is that if injured the case can be repaired more easily. There is finally the thought that a wooden gear case may reduce the noise of the gears, although there is no definite information on this point.

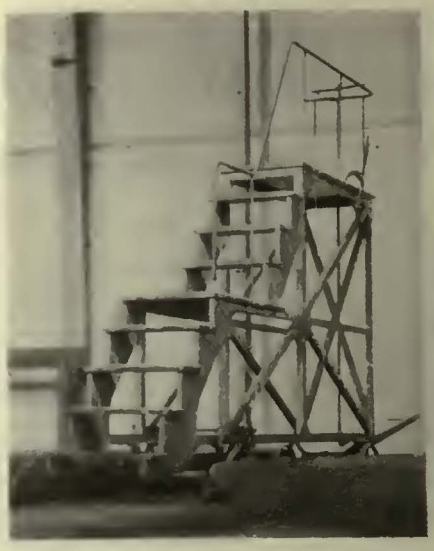
The gear case is made of whitewood, strapped with No. 12 or No. 20 malleable steel straps. The top and bottom parts are of ¼ in. plywood, which is steamed and bent to shape before being nailed to the sides. The nails used are 1 in. with a screw thread. A strap of No. 20 s.w.g. gage malleable steel protects the bottom from injury. All rivets used are of copper with a flat head inside the gear case.

Before being put into service each half of the gear case receives not less than four coats of gray enamel, each being thoroughly dried before the next is applied, to insure that the surfaces, especially of the interior, are finished with a hard, glossy and oil-repelling coating.

The cost of the gear case is about 50 shillings ($12) each.

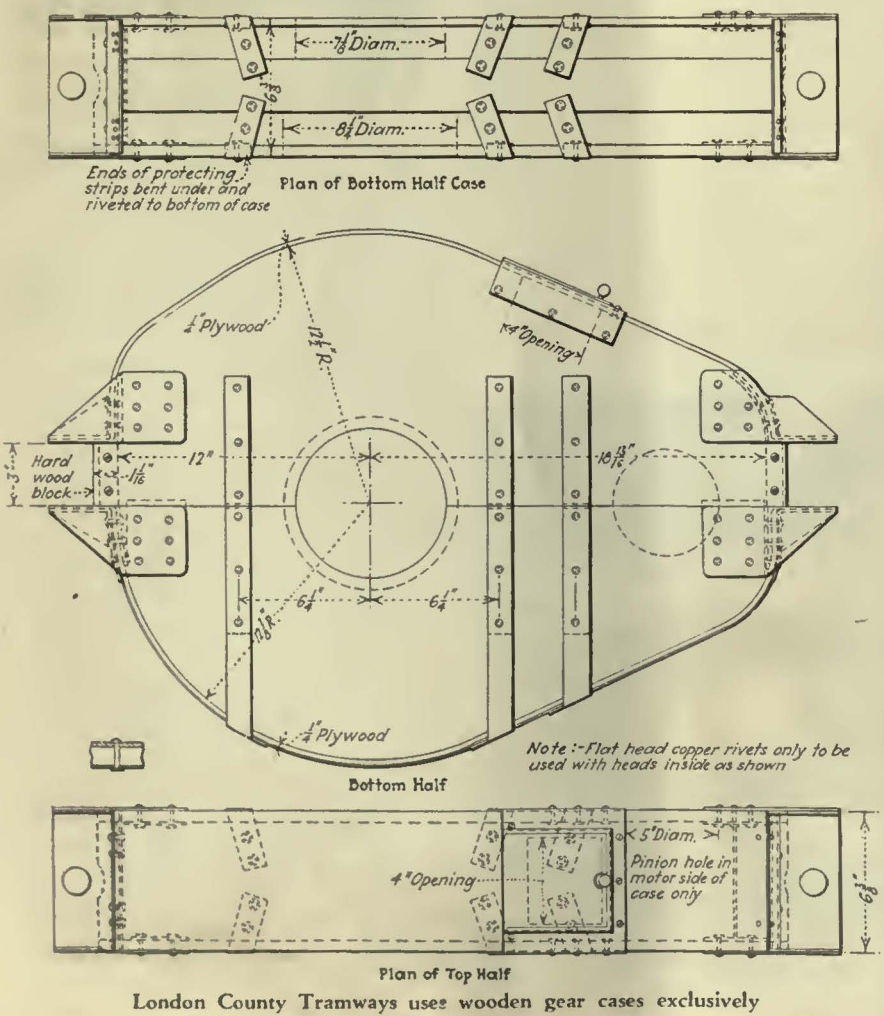
Ladder for Depot Inspection of Cars

MOVABLE ladders or scaffoldings for the use of car inspectors are part of the equipment of the carhouses of the Berlin Surface Lines, Berlin, Germany. One of these ladders, shown in the accompanying illustration, is mounted on six wheels and can be pulled from one corner of the carhouse to another very easily by a handle in front. It is also fitted with a brake which is



Movable ladder used for car inspection in carhouses of Berlin Surface Lines

set from the upper platform. This upper platform is high enough so that the trolley and other parts on the roof can easily be inspected from it. As the motor resistances in Berlin are carried on the roof instead of underneath the car, roof inspection has to be somewhat more thorough than otherwise. There is another platform on the ladder about half way down.



London County Tramways uses wooden gear cases exclusively

Prolonging Life of Steel Ties in Concrete

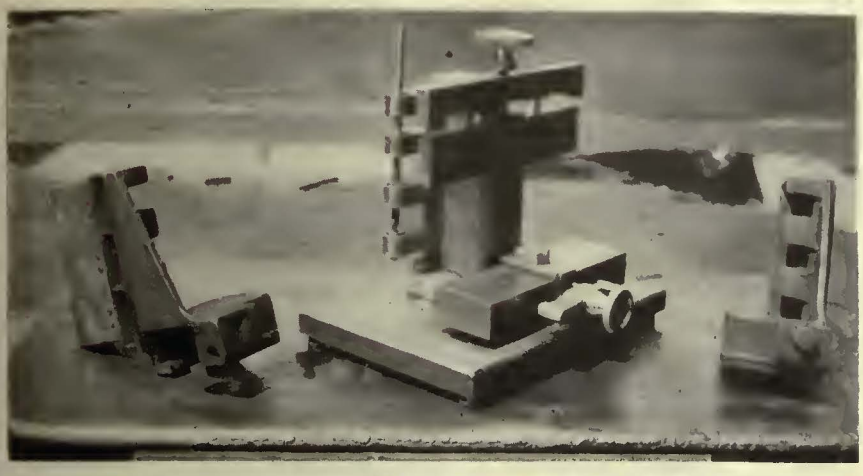
By Louis T. Botto
Superintendent Maintenance of Way San Antonio Public Service Company, San Antonio, Tex.

BEFORE placing the concrete in steel tie track construction a final test should be made to make certain that each tie bolt is tight. Each bolt should be given a tap with a light sledge and then the nut should be given its final turning.

Good results in concreting are obtained by using a 1:3:5 mixture. If the sand varies in color or texture it should be tested to insure that it will make good concrete. Sound materials are essential. The amount of water in the concrete should be kept as low as possible to permit proper workability and the concrete should be tamped thoroughly under and around the ties and rails. It is good practice to delegate a man to see that this tamping is performed carefully.

After concreting, traffic should be kept off the new work for at least fifteen days and the concrete should be kept damp during this period. With the observance of these simple precautions, under ordinary conditions steel tie construction should last the entire life of the rail.

Combined Gage and Jig for Brush Holders



A combination jig and gage for Westinghouse type 50L brush-holders is shown in the center. On each side is a brush-holder, one right hand and the other left

THREE carbon brushes per brush-holder are used with the Westinghouse type 50L railway motor. The $\frac{5}{16}$-in. pin about which the pressure adjusting mechanism pivots passes across the entire width of the brush-holder and through lugs at each of the partitions separating the brushes. It is thus necessary to drill four holes in the brush-holder lugs in order to insert the pin. These holes must be located accurately so as to line up with each other and also so as to be in a plane perpendicular to the brush-holder support.

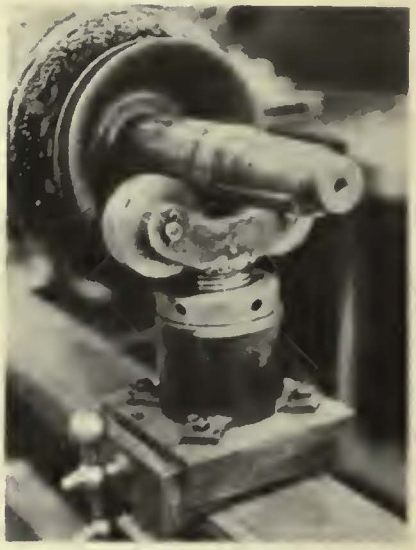
When these brush-holder holes become worn it is the practice of the Brooklyn - Manhattan Transit Corporation, Brooklyn, N. Y., at its 39th Street repair shops to fill in the holes by welding and then to redrill them. For this work a convenient jig has been constructed, in which a pair of brush-holders, one right and one left, can be inserted and drilled with one setting. The jig has a rectangular steel bar just above the base plate over which the casting support fits. The upright portion of the jig is arranged with four arms which project out and fit on either side of the carbon brush separating partitions. In order to place a brush-holder on the jig it is necessary for the carbon boxes to be perpendicular to the section which fits about the support. Any distortion of the brush-holder castings will prevent their being shoved into position and so the jig serves as a gage for making certain that the brush-holders are in proper alignment. With the brush-holders in position they are clamped tightly by two knurled knobs. The entire fixture with the two brush-holders in position is then placed on a drill press and the holes are drilled in one operation.

The accompanying illustration shows the jig with two brush-holders, one on either side. The drill is shown in the bushings of the arms so as to indicate just how the holes for the pivot pins are drilled.

Aligning a Commutator for Slotting

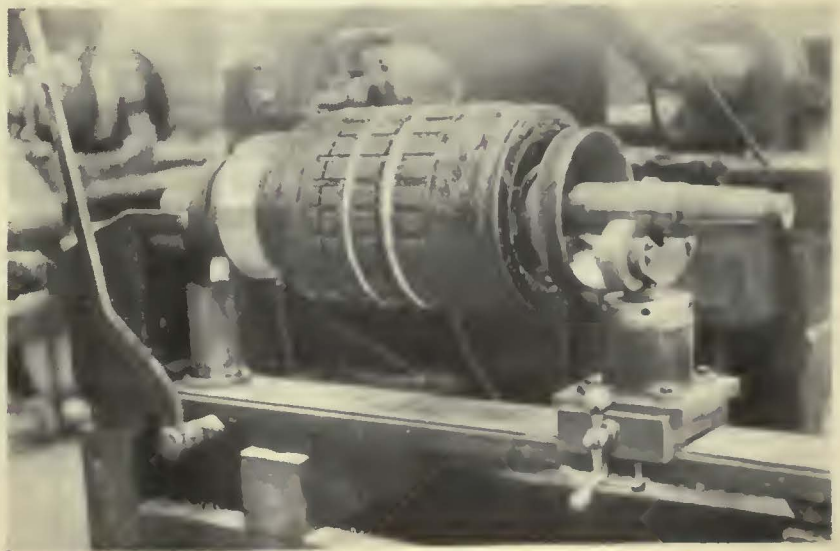
TO INSURE accurate slotting of commutators a valuable attachment has been developed and installed on the commutator slotter used in the shops of the Market Street Railway, San Francisco. This consists of a tailstock mounted on the bed of the slotting machine which allows for the transverse movement of the pinion end of the armature so that the travel of the milling cutter may be made to follow the slot in the commutator. Rarely is the commutator assembled with the slots directly in line with the shaft.

The tailstock allows for this transverse movement of the pinion end of the armature and also for raising and lowering. It slides freely on the bed of the machine. Incorporated in the base is a feed screw which moves the upper part across the baseplate, similar to the cross feed on a plate. The upper part includes a large diameter elevating screw with supporting nut having holes for a spanner wrench. The head of this screw is Y-shaped with 3-in. rollers mounted on pins near the ends of the frame.



Tailstock allows for both transverse and vertical movement of gear end of armature shaft

The cross feed is similar to that used in a lathe. The elevating screw is similar to those in house jacks. The two rollers in the Y frame are identical with two in the head of the machine



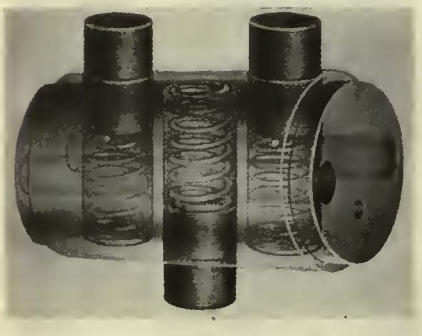
Commutator slotter equipped with tailstock to allow for accurate alignment of commutator segments with the milling cutter

New Equipment Available

Improved Features in Trolley Wheel

AUTOMATIC lubrication by means of graphite plugs is an outstanding feature of an improved trolley wheel being marketed by the Ohio Brass Company, Mansfield, Ohio. Three graphite plugs provide sufficient lubricant for at least 30,000 miles of service. The plugs are compounded especially for this service and provide for lubrication throughout the life of two O-B wheels. They eliminate the use of oil or grease.

The graphite plugs are inserted in the axle and are pressed outwardly



Three graphite lubricating plugs provide lubrication for the trolley wheel

against the wheel bearing surface by means of three coil springs. Two of the plugs press against the bottom of the wheel bearing and one against the top. They are of sufficient size and spaced closely to insure constant lubrication of the entire bearing surface of the wheels.

Unusually large closely fitted bearing areas for the axle and harp are provided. One-half of the axle bearing area is always in close contact with the wheel, while the machined butting areas of the axle are clamped solidly against the equally large contact areas of the harp, which eliminates brush contact washers and springs. The axle is made of hardened cold-rolled steel and is ground accurately to size. Its area is three to four times the usual area of the pins generally used in old-style trolley wheels and harps. The axle is bolted solidly against the two halves of the harp by two bolts which pass through the axle. These bolts can be drawn up as tightly as desired without affecting the operation of the wheel. Thrust washers made of special Bakelized fiber are placed on each end of the axle between the wheel hubs and the harp to prevent end play of the wheel and contact with the harp. These washers prevent arcing between the wheel and the harp and resist moisture.

The wheel itself is cast of a high-grade bronze alloy developed particularly for electric railway service. The harp is made of Flecto malleable iron, which is claimed to be free from brittleness. It is hot-dip galvanized.

Cold Steam Cleaning Equipment

EQUIPMENT for cold steam cleaning of automotive equipment has been announced by the Cold Steam Corporation, Charlottesville, Va. It includes a boiler with necessary connections and a cold-steam nozzle. The boiler is of the vertical fire tube type, designed for working pressures up to 200 lb. per square inch. It is made in accordance with the American Society of Mechanical Engineers boiler code.

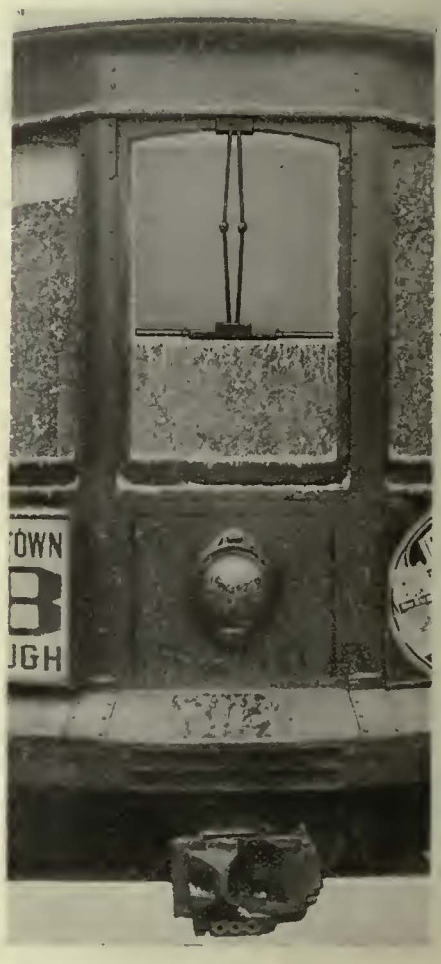
The burner is either of the gas type or the fuel-oil burning type, the former being recommended for use where natural gas is available or where the pressure of artificial gas is sufficiently high. In the oil-burning equipment fuel or furnace oil is used. Preheated water is fed to the boiler by means of a positive driven pump which is controlled automatically and maintains a constant level of water in the boiler. As a further precaution the controller is fitted with a low-water alarm whistle which gives warning should the water fall below the normal level.

Steam is piped from the boiler to the washstand where the steam hose is attached. A cold steam nozzle is provided which is provided with connections to both the steam and water lines. As steam is used at a pressure of about 150 lb., this passes through the nozzle and picks up and mixes with the water in whatever quantity desired. This quantity is determined by the operator according to the needs of the cleaning job and is adjusted by means of the nozzle.

Where it is desired to use some form of soap mixture or other liquid cleaner, hose lines may be attached to their containers and by turning a valve the contents are projected through the nozzle as desired. Two or three-way valves may be used in the water line.

Vertical Moving Window Wiper

SURFACE of 24 in. wide and 22 in. long is cleaned by a vertical window wiper which is a product of the Cinch Manufacturing Corporation, Chicago, Ill. This wiper was designed and perfected in co-operation with several electric railway companies where trials have been made. The principal feature of the Cinch ver-



Window wiper in its lowest position. It returns to the top automatically by spring pressure

tical swipe is that glass is cleaned by a vertical movement, so that rain or snow are carried downward and out of the way.

The movement of the wiping part is by means of a pantograph with two arms pivoted at the top of the sash. The outside pantograph frame is caused to move by the turning of a handle which is fastened to a shaft projecting inside the vestibule of the car. By turning the handle through an arc of 45 deg. the swipe is brought to its lowest position and it returns automatically to the top by spring pressure. In its normal position the swipe is at the top of the glass so as not to obstruct vision.

News of the Industry

Trial Run in Rochester's Subway

Following an inspection trip by railway and civic officials and industrial leaders in the first car ever operated by electricity over Rochester's new subway in the bed of the abandoned Erie Canal, it was announced that the line will start operation about Sept. 15.

It is expected that the interurban cars of the Rochester & Eastern and the Rochester & Syracuse Railroads will be the first to run in the city-built line. City surface cars will not be diverted into the subway until the signal system is completed about Dec. 1.

The Common Council favors operation of the line by the New York State Railways for a three-year trial period under terms similar to those that apply to the city trolley and bus lines, conducted under a service-at-cost contract.

The trial run was made from Winton Road at the extreme eastern end of the line to City Hall Station at the rate of a mile a minute. The entire 9 miles of the subway, which bisects the city, following the route of Clinton's "Big Ditch," was covered by the party.

The new line will not only take all interurban and much surface traffic off the streets, but will provide added switching facilities for industries along the line, under separate contracts to be made with the five steam railroads entering the city.

Civil Service Suggested for Detroit Employees

A movement has been started in Detroit which, it is believed, will ultimately result in the establishment of city civil service for employees of the Department of Street Railways. Del A. Smith, general manager of the D.S.R., recently asked the Corporation Counsel's office for an opinion as to whether the charter or the department regulations permit the discharge of employees because of nationality.

Mr. Smith is quoted as having stated that should the Corporation Counsel agree with the opinion that it is within the power of the Street Railway Commission to adopt any regulation it sees fit to govern the selection of employees, he would ask the commission to adopt a rule barring from the D.S.R. employ aliens who have had an opportunity to become citizens but have not availed themselves of it.

It is stated that 50 or 60 alien employees of the department have taken out their first papers. Mr. Smith believes that men not interested in the city sufficiently to become citizens should not be connected with a government department.

Mayor John W. Smith has announced that he will ask the Street Railway Commission to place the D.S.R. under civil service, and an opinion has been received by him from the Corporation Counsel's office to the effect that it is mandatory upon the city to amend its Charter in conformance with the Home Rule Act, and establish a D.S.R. civil service system. The Corporation Counsel's office also has under consideration the request of the D.S.R. general manager regarding the status of alien employees of the D.S.R. and the opinion has been expressed that the D.S.R. has the right to make its own rules regarding aliens.

The Mayor's action is said to be opposed by officials and representatives of the Amalgamated Association. Following a brief meeting between them, the Mayor and union representatives declined to make any announcement about the outcome of their talk.

Expert Recommends Co-ordination for St. Louis

Report not made public, but Mayor reviews his attitude toward subjects about which differences of opinion exist

ROBERT M. FEUSTEL, who recently made a survey of the St. Louis railway situation at the request of Mayor Victor J. Miller, in a report submitted to the Mayor is understood to have recommended co-ordination of buses and street cars with a service-at-cost franchise as the best solution of the city's railway needs.

Mayor Miller has not determined whether a franchise shall be granted to the St. Louis Public Service Company when that organization takes over the United Railways properties, probably in October. The original plan of the reorganization committee of the United Railways was to secure a 30-year service-at-cost franchise for the new company with the right to earn 7 per cent on a valuation of approximately $60,000,000. Subsequently this offer was withdrawn because the city administration had failed to act within the time limit fixed by the company.

The contents of the report of Mr. Feustel to Mayor Miller will not be made known at this time. However, the Mayor and Mr. Feustel are said to be in agreement on the fundamentals of the St. Louis situation.

The suggestion of co-ordinated bus and railway transportation is not new for St. Louis. Several years ago the reorganization committee endeavored to purchase the competing People's Motor-bus Company, but the parties could not agree as to price. Subsequently the reorganization committee formed the St. Louis Bus Company to supplement its railway service.

In this connection it is interesting to note that the Mayor is of the opinion that municipal ownership of the city's street car system would not solve the railway problem. The Mayor said:

> This problem cannot be solved in a few days. Within the next five weeks I intend to have formulated a policy with regard to the properties of the United Railways, its ownership and future possibilities.
>
> Urban railway transportation is in a state of change and it is very difficult to forecast just what transportation facilities will be most useful for the city within twenty-five or fifty years.
>
> The city will probably employ several experts from other municipalities to aid in solving our problems. I intend to ask the Board of Aldermen for an appropriation for this purpose as soon as I can. I do not know as yet where we will go for our engineers and consultants.

Mayor Miller has outlined four ways of meeting the St. Louis railway problem. His suggestions briefly are:

1. Allow company to continue under existing franchises. This would make it difficult for the company to secure loans over a long period of time for financing and operation purposes.
2. Municipal ownership.
3. Semi-public ownership. Under this plan the city would build and own the facilities and lease them to an operating company.
4. Adopting of a service-at-cost franchise or some similar plan.

The city administration has favored a service-at-cost plan, but failed to

COMING MEETINGS OF *Electric Railway and Allied Associations*

Sept. 13-15—International City Managers Association, Dubuque, Ia.

Sept. 19-23—American Welding Society, national meeting, Book-Cadillac Hotel, Detroit, Mich.

Sept. 26-30 — National Safety Council, annual congress, Hotel Stevens, Chicago, Ill.

Oct. 3-7—American Electric Railway Association, annual convention, and exhibit, Public Auditorium, Cleveland, Ohio. Exhibits open at noon of Oct. 1.

agree with the reorganization committee of the United Railways on the valuation for rate making purposes or the amount of return the company should be permitted to earn. The reorganization committee asked for a 7 per cent return, but Mayor Miller contended that 6 per cent was sufficient.

Baltimore Hearings Started

The Maryland Public Service Commission started hearings on Sept. 6 on an application made by the United Railways & Electric Company, Baltimore, for an emergency increase in fares pending later action on the company's application for a 10-cent fare. The entire hearing was devoted to determining whether an emergency exists that necessitates an immediate increase.

Thomas J. Tingley, People's Counsel, led the opposition to the increase. Charles C. Wallace, City Solicitor, and lawyers for various organizations also joined with Mr. Tingley in opposing the increase.

Charles Markell, who represented the United, told the commission that the United had been operating since 1920 under rates that were confiscatory. He pointed out that the commission said several years ago that the company should earn a net of at least $1,000,000, which would be a fair and reasonable return on its investment, but this amount was earned only in 1926, when the greatest economies were instituted. The income of the railway since 1920, he said, has fallen short of the minimum of minimums.

The company has been operating at zero and finds it cannot operate below zero, Mr. Markell told the commission. He denied that the number of passengers on short rides had decreased because of fare increases and also said that people ride in automobiles because they want to and not because of the car fare charged. Mr. Markell also declared that if the fare were lowered to 5 cents it would have no appreciable effect on the number of car riders.

Mr. Tingley replied to Mr. Markell and denied that the need of an emergency increase existed. He said the company had not instituted every possible economy.

Cites Court Decisions on Cost of Removing Conduits for Chicago Subways

Opinions rendered to the Chicago City Council on Sept. 2 by Assistant Corporation Counsel James W. Breen indicate that the expense of removing and relocating pipes, wires and conduits in connection with subway construction or other improvements must be borne entirely by the public utility companies. Mr. Breen cited numerous Supreme Court rulings which sustain this requirement and refuse to allow such expenses in cases of subway building to be added to the subway rental and indirectly saddled upon the rider.

Convention Guests

MEMBERS of the American Electric Railway Association can extend the privileges of the Cleveland convention to their guests as in past years by registering them on the forms provided at the registration desk. Better still, guests should be pre-registered on the forms distributed to members some time ago. Use of the pre-registration cards will obviate the delay when entering the auditorium, as the badges will then be ready in advance and presentation of the duplicate card will complete the registration.

For those who wish to extend the privileges to guests for a single day only, guest tickets have been provided which will admit the bearer to the convention and exhibit. These tickets will be collected at the door. They are intended particularly for company members in Cleveland and vicinity which desire to have employees and others visit the convention without remaining for the entire time. They may be obtained on application to the executive secretary, J. W. Welsh, 292 Madison Avenue, New York City.

Problems of Salt Lake Company Explained

Rerouting of the Poplar Grove cars of the Utah Light & Traction Company, Salt Lake City, Utah, has been ordered by the Public Utilities Commission, the test to continue for a period of six months from the date on which it begins. This decision was reached at the hearing on the application of the company to abandon service and remove its tracks on Seventh South Street between West Temple and Eighth West Streets. The hearing was continued to the end of the six month test period. In the meantime, the tracks which the company sought to remove on Seventh South Street will be allowed to remain during the six months trial of the new routing.

Edward A. West, general manager of the company, testified that the cost of operating the cars over the section of road it was sought to abandon was $1,085 a month, while the average monthly revenue on that section was $370, leaving an operating loss of $715. There are twenty railroad crossings over which the company's cars pass in going over the Seventh South line. It is largely to eliminate the maintenance of those crossings that the company desires to discontinue service on West Seventh Street.

Mr. West testified that many portions of the system were not paying and that to serve the public best those sections should be pruned from the system. He said the railway had been laid out before the coming of the automobile, and that the system now is too large for the demand of the public.

Salt Lake has 1 mile of trackage for each 1,200 people, while the average in cities of comparable size is 1 mile of trackage to each 2,000 inhabitants. Mr. West declared that average earnings in Salt Lake are much lower than elsewhere, being only 30 cents per mile, compared with 44 cents per mile nationally. The maximum earned on any line in the Salt Lake system is 36 cents per mile, while the minimum is 8 cents. He declared that on the Seventh South Street line the average was 8 cents and that on the North Yard line it was 15 cents.

The commission will conduct a hearing at once on the application of the company to discontinue service on the Holliday line south of Thirty-third South Street. Hearing on the application to discontinue the Mill Creek bus line is also scheduled.

Reconsider Unlimited Term Franchise Bill at Chicago

A decision on the part of the local transportation sub-committee of Chicago, Ill., to reconsider its removal of the 40-year limit on franchises in the legislature marked the only new development in that quarter during the past week. The bills were drafted recently to facilitate settlement of Chicago's traction problems. In revising Senate bill No. 439, one of the Insull traction bills which was defeated in the legislature last June, the aldermen struck out the 40-year clause and substituted the recommendation that the City Council be empowered to grant a permit for 20, 50, 75 or any other number of years. Critics immediately assailed the measure, however, on the score that no protection would thereby be afforded against a perpetual grant. In consequence of this protest the subcommittee decided to reconsider its action at a subsequent meeting. The redrafting of the other 4 bills was completed on Aug. 31.

New Outing Bureau in Chicago Benefits Electric Lines

During the first month of its establishment, the outing and recreation bureau jointly maintained in the city of Chicago by the transportation companies and other local utilities under the management of Samuel Insull and associates has received and answered more than 16,300 inquiries about low-cost vacation trips in the metropolitan area, officials of the bureau recently announced. Telephone calls totaling 12,880 and approximately 3,500 personal calls for outing information were handled in that period and more than 38,000 pieces of vacation literature issued.

The bureau was opened on June 27 to furnish the public with suggestions for outings, vacations, picnic and sightseeing trips in and around Chicago. Attractive, inexpensive jaunts to many nearby resorts and parks have been mapped out by the bureau with full information as to costs, length of trip, things to be seen, etc. The service is free.

Striking window displays of vacation scenes and a large variety of folders

and maps describing the scenic and recreation facilities of the region have been used to promote the service rendered. Among the transportation companies interested in the bureau are the Chicago Rapid Transit Company, Chicago, North Shore & Milwaukee Railroad, Chicago, Aurora & Elgin Railroad, Chicago, South Shore & South Bend Railroad and the Shore Line Motor Coach Company. The bureau also serves as a consolidated ticket office for these companies.

Pennsy to Electrify Baltimore Lines

Electrification of the Pennsylvania Railroad in and near Baltimore within the next three years appears to be in prospect. George M. Smith, superintendent of the Baltimore division of the road, recently indicated that the company's roads in and near Baltimore will be electrified and the power used in operation of freight and passenger trains by 1930.

One-Man Car Suggestion Opposed in Los Angeles

Local railway states its case against use of this equipment under peculiar conditions that exist in Pacific Coast Utilities

AT A RECENT hearing before the California Railroad Commission on the application of the Los Angeles Railway for increased fares, the chief engineer of the commission recommended the operation of one-man cars in Los Angeles as a measure of economy. Several different plans were proposed. They included one-man car operation throughout the city, and a zone plan operating two-man cars through the central district and changing to one-man operation outside.

The company is opposed to the suggestion. Figures in the hands of the railway show that the operation of one-man cars would not be a measure of economy in Los Angeles, particularly since the present type of equipment is not adapted to this operation. The engineering department of the railway estimates that the interest charge alone on the capital investment required to make the change would be more than $170,000 a year, which must be deducted from any possible savings. The commission's engineers estimate that a year would be required to put the proposed system into effect.

According to the company there will be besides this the following, all militating against the proposal:

The additional cost of breaking in, as every man would have to be qualified not only as a conductor but as a motorman as well. The San Diego Street Railway reports that approximately 5 per cent of its trainmen cannot qualify for one-man car service. The percentage in Los Angeles would probably be about the same.

Additional supervisory, instruction and cash receiver forces to handle this work, with resulting heavy increase in payroll.

Difficulties of the operator having to stop to pull switches, plug them and going back to take plug out before proceeding.

Additional hazard at railroad crossings on account of flagging.

Greater delays in the case of accidents or blockades.

An increase in the possibilities of hold-ups.

Fenders of the present type are too heavy for one man to handle. This type of fender is used on account of a city ordinance and must be changed from one end to the other at every terminal every trip.

The opinion of the management is that on the Los Angeles system, with the extremely heavy passenger pick-up at many transfer points, and at practically all terminals it would be impossible for one man to handle the situation; and increasing layover time runs into a great deal of money. As the officials of the company see it the cost of one-man operation might be greater than operation under the present man power, not to speak of the easily figured inconvenience and delay to passengers and general street traffic. A loss of 1.38 miles in every car-hour means that during the average week day 10,000 fewer miles would be traveled under any of the suggested one-man operation plans than at present and 60 additional slower moving cars would be on the streets.

St. Paul Seeks Relief From Heavy Expenses

The St. Paul City Railway, St. Paul, Minn., is working for an amendment to the city charter to carry out a recommendation by the Minnesota Railroad & Warehouse Commission made more than a year ago that the city remit some of the expenses under the present charter in regard to paving. The company is now required to do work that costs $56,000 a mile. It estimates that paving relief will reduce operating expenses $115,000. This would make a more reasonable return to the company at the present rate of fare of 8 cents cash or 6 tokens for 40 cents.

It is the contention of the company that paving between the tracks began with the horse car, when the horse motive power wore out the road. Although the electric car does not do this the car rider is still saddled in that city with a charge that prevailed 50 years ago.

Under the proposed amendment the Council will be able to relieve the company of all paving and foundation for paving and maintenance of both; also to relieve the company of all charges for street sprinkling, cleaning, sweeping and removal of snow and ice from the streets except from the tracks.

Wage Reduction Plea Rejected by Oakland Men

A proposal of the Key System Transit Company, Oakland, Cal., to its platform employees urging that they accept a reduction in their wages of 5 cents an hour has been rejected and the uniformed operators will stand by their agreement of two years ago with the company.

This was revealed following a meeting at which the executive committee presented the "suggestion" of the company to the men after debating the merit of the request for ten days.

It was announced that the reduction in wage was essential to the company because its financial condition is "desperate and critical" and that the need for economy on the part of the employees will remain for a year only. The alternative proposition that the employees keep their present wage and accept changes of hours that would result in a similar reduction was also voted down by the operators.

New Fare in San Antonio

A "compromise" schedule recently operative on the lines of the San Antonio Public Service Company, San Antonio, Tex., reduces the price of weekly nickel tickets from 30 cents to 25 cents, but otherwise leaves unchanged the fares, ranging up to 10 cents for adults. It places bus fares within the city limits on a parity with trolley fares (outside the city the fare is 2 cents additional on either bus or street car). The new rates also authorize sale of books, good for 30 days, giving children under seventeen years old forty rides for $1.20 or 20 for 80 cents.

This "reduced" schedule of car and bus fares has ended, at least temporarily, a controversy waged since the San Antonio Public Service Company several weeks ago, increased cash fares from 6 cents to a maximum of 10 cents. All members of the City Commission failed to agree to the new schedule, which is in the nature of a compromise, but a deadlock in the commission prevailed to prevent proposed granting a franchise to a new bus concern that offered a 5-cent transportation. This deadlock also blocked a proposed independent audit of the present railway company's books. The company never conceded the the city's right to require the latter's consent to a change of fares.

The increased car fare schedule, in effect since July 10, made the cash fare 10 cents, but provided for the sale of three metal tokens for 25 cents and for the sale at 30 cents of transferable tickets which permitted holders to ride for one week at 5 cents additional per ride. Children's rate was raised from 3 to 5 cents straight, and for school children under seventeen a 10-cent cash fare. In both cases a ticket rate was established.

Railway to Resume in Mount Clemons

Railway service is to be resumed in Mount Clemons, Mich. Bus service operated on the streets for the past six weeks was termed unsatisfactory and the Detroit United Lines was ordered by the City Commission to place the line back into service. Petitions are being circulated in Lake township for restoration of interurban service on Jefferson Avenue. The service was stopped by the village of St. Clair Shores at the expiration of the franchise on July 21.

North Shore Line Provides Inter-Line Ticket Sales Service

A new interline ticket sales service whereby through tickets to any point in the United States served by a steam or electric railroad can be purchased at any of the company's passenger stations, has been started by the Chicago, North Shore & Milwaukee Railroad. Interconnecting ticket arrangements, including Pullman reservations with all steam lines in the country, have been established for the convenience of North Shore Line patrons. Arrangements have also been made with the Parmalee Transfer Company in Chicago for the free transport of North Shore Line passengers and hand baggage from downtown stations to all steam railroad terminals.

New Paper in Richmond

The first number of a magazine for the employees of the Virginia Electric & Power Company, Richmond, Va., has been issued. Nameless now, it will be christened by one of the employees. The employee who chooses the best name will be awarded $10 in gold. A. H. Herrmann, Richmond, is editor of the magazine, and C. S. Stackpole, also of Richmond, and E. H. Will, of Norfolk, are associate editors. The first number of the publication has sixteen pages. Four thousand copies of it were distributed to the employees.

240,000 Miles Without Accident

Ten employees of the New York State Railways, Rochester, N. Y., lines are now clad in brand new uniforms. It's all because they were careful.

The ten men comprise team No. 15 of the Federal Street division in the annual accident prevention contest of the railway. All trainmen of the Rochester lines were divided into teams of ten men each. To be eligible the ten men on the team must have operated a total of 3,000 days, or an average of 300 days each during the year. The winning team, captained by Theodore Hyde, operated a total of 240,000 miles for the twelve months without a chargeable accident. There were three other teams, one from the Federal Street division and two from State, which operated during the year without an accident, but they did not qualify in operating the required number of days.

Accident prevention contests are part of the safety work being carried on under the direction of Leon R. Brown, safety director of the Rochester lines of the New York State Railways.

A careful crew rewarded for what it could do

Ohio Wreck Laid to Trainmen

Trainmen on the Dayton & Troy Electric Railway were at fault in causing a collision on that road near Dayton, Ohio, on June 25, according to a decision of the Interstate Commerce Commission's safety bureau. In the wreck four persons were killed and 39 were injured. The report also stated that in the opinion of the Commission an adequate block signal system on the line would probably have prevented the accident and that an automatic train stop system would have certainly done so.

To Smoke or Not to Smoke

Over this question the Georgia Power Company, Atlanta, Ga., has aroused a considerable argument. Some weeks ago "Two Bells," its official organ, published an article asking car riders to express an opinion as to whether or not its present "No Smoking" rule should remain in force.

In view of the increasing number of women who smoke, officials were seriously considering a change in the rule. But the referendum, in addition to arousing public interest in the affairs of the company, has brought out the fact that a large majority of the riders are opposed to smoking on the trolley and a still larger number are opposed to allowing women to smoke there! The question whether women should be allowed to smoke has almost made a side issue out of the original question.

Danbury Company Will Sell Certain Franchise Rights

The Danbury Power & Transportation Company, Danbury, Conn., has asked the Public Utilities Commission for approval of its proposed plan to sell its franchise rights for distribution and generation of electricity, and its power plant and equipment to the Danbury & Bethel Gas & Electric Company. The petition states that the seller is to reserve to itself its rights to maintain and operate a transportation system.

Superior Fare Hearing Deferred by Commission

The hearing by the Railroad Commission on the request of the Duluth Street Railway, Duluth, Minn., for higher fares in Superior, Wis., has been postponed to late September. The company contends that the present cash fare of 10 cents or five tickets for 30 cents is insufficient to produce a fair net return.

Opening of Philadelphia Tube Delayed

The North Broad Street subway of Philadelphia, Pa., built by the city at a cost of $100,000,000, will not be placed in operation before next May. This was disclosed recently by officials of the Philadelphia Rapid Transit Company which will operate the line. City engineers, it was said, were in accord with the company's findings contained in an engineering survey that the city-built tube could not be ready for regular train service before the expiration of Mayor Kendrick's term in office. Delay in installing the signal system and other essential equipment and failure to provide adequate terminal facilities for through operation under City Hall before the South Broad Street unit is completed were the factors cited by the Philadelphia Rapid Transit Company experts as contributing to the delay.

Loud Speaker in London

Two cars of a train on the Charing Cross & Hampstead section of the London Electric Railway have been fitted with loud speakers. One car has a horn under the roof and the other has a double-mouthed rectangular speaker from which the sound emerges in two directions. The guard has a mouthpiece into which he speaks, giving information on the next station, and connections which can be made there. Tests are being made on the same sort of equipment to give communication between guard and driver.

Electric More Economical than Steam in Switzerland

Twenty thousand tons of coal are being saved yearly because of the adoption of electric railway service in Switzerland. Directors of the Rhätian line, which extends for 173 miles and which has been operating for the last five years, have reported other economies. According to their statistics a reduction of 52 per cent is being made in the engineering staff at the workshops for the maintenance of electric locomotives; 48 per cent in the track maintenance department and 43.5 per cent in the service personnel.

Railroad Electrification in Austria

The Austrian State Railroad authorities are planning two new schemes of railroad electrification. The first scheme will occupy a period of five years in completion. It will involve about 380 miles on the Vienna-Salzburg and Vienna-Gratz-Nauer lines. In the second plan a total of about 475 miles will be electrified.

Halfpenny Fares Restored in Glasgow

The halfpenny fare, which was abolished in Glasgow in 1920, was reintroduced last month by the Town Council. This 1-cent charge covers one stage, or half a mile. Heretofore two stages, or about a mile, were obtainable for a halfpenny. The present move is regarded as experimental and has been recommended as such by the general manager, although the adoption of the 2 d. fare for any distance beyond the 1 d. stage has proved very successful, resulting in the increase, it is believed, of £82,196 in the tramway traffic revenue for the financial year ended May 31.

Bus Proprietors Propose Plan to Middlesex

The London Omnibus Proprietors Association has proposed to the Middlesex County Council to institute a system of bus operation. For the last two or three years the Metropolitan Tramways has been operating the Middlesex cars at a loss, due chiefly to bus competition, it is believed. For this reason there seems to be doubt whether the lease, which expires in 1930, will be renewed. According to the secretary, the association would be prepared to participate in a reasonable scheme of compensation by annual tax or donation to the County Council for loss of capital, and it is prepared to cover a system of fares and timings intended for workmen.

Trolleys More Profitable than Buses in Brisbane

Much of system rebuilt since city took it over about four years ago

THE annual report of the Tramways Department of the Brisbane (Australia) City Council gives £178,672 as the net revenue from railway and bus operation for 1926, but after deduction of interest, depreciation and other fixed charges, the deficit was £7,748, compared with a deficit during 1925 of £26,395. The bus operating revenue was £16,750. There was an increase of £61,188 in total revenue during the year. The increase in operating expenses, according to the report, is due to the operation of the 44-hour week for the full year and to additional services to the public.

Since the purchase of the property by the municipality four years ago, 38 miles of new track has been laid, 71 new cars have been built and other improvements have been made. Further extensions to the rolling stock and new shops are recommended. On the bus situation, the report refers to the loss from operation during the year (£5,631) on the eleven buses used, and says that individual operators have a better chance at success, as the drivers will work longer hours. It then proposes that the municipal bus service be abandoned, presumably under conditions by which private buses would be employed in their place in supplementary rather than in competitive service.

Electricity for South Manchurian Railway

The South Manchuria Railway, Shanghai, China, is now planning electrification of a part of its system. This decision follows experiments on the line serving the Fushun collieries, where the electric railway system has been giving more favorable results than steam locomotives.

At Anshan, Manchuria, where the Anzan Iron & Steel Works are situated, electric locomotives have been put in use for carrying ore from the Takushan mine, also with favorable results.

The first section to be electrified will be the Fushun branch line, which joins the main line at Suchiatun Junction. This will be followed by the Suchiatun-Mukden section on the north and by the Suchiatun-Liaoyang section on the south.

After the program mentioned above has been carried out, the shunting engines on the Dairen wharves will be the next to be electrified. Plans have been made to increase the electric power supply at Dairen by 10,000 kw. in order to meet in part the need for service to the electric railways planned.

York Shows Falling Off in Travel

Figures from York Municipal Tramways, England, for the year ended March 31, 1927, show a decrease of 1,000,653 tramway passengers and of 4,681 railless passengers. The municipal buses carried 207,618 more passengers than last year, but the total figures for passengers carried, 8,357,572, was 797,716 less than in the previous year. There was an operating income, after deduction of expenses, but after the charges for interest and sinking fund there was a total deficit of £5,013 from all three services.

Expenses Increase on Belgian Light Railway

According to the report of the Société Nationale des Chemins de fer Vicinaux for 1926, expenses have gone up, due largely to the devalorization of the Belgian franc, while it has been impossible to increase charges as rapidly. The Société Nationale is a large railway system extending through all parts of Belgium, with 4,361 km. (2,739 miles) of track. The gross earnings in 1926 were 157,871,463 francs and the expenses 149,668,993 francs. This gives an operating ratio of more than 94 per cent as compared with 90.68 per cent in 1925. Rates have now been increased, however, the second class passenger rate per kilometer from 0.13 to 0.22 francs and the first class rate from 0.17 to 0.28, with corresponding increases in the freight rates. The system has 649 electric motor passenger cars and 613 trail passenger cars, but the greater part of the property is still operated by steam. The steam equipment includes 836 locomotives and 2,014 trail passenger cars. Thirty-six motor buses have been put in service.

Liverpool Reports Slight Gain in Revenue

The report of the Liverpool Corporation Tramways for the twelve months ended March 31, 1927, gives receipts from passengers as £1,389,150, a gain of £5,189 over last year. The passengers carried were 247,608,127, a gain of 440,119 over 1926. The total revenue of the system for the year was £1,436,805.

After payment of interest, sinking fund requirements and repayment of loan, there was a surplus of £157,443. Wages constituted 46.5 per cent of the total revenue. The 1 penny ticket represented 68.30 per cent of the total number sold. Next comes the 2 penny ticket with 30.03 per cent.

Recent Bus Developments

Indiana Commission Defines Its Powers on Bus Operation

In an opinion to F. T. Singleton, chairman of the Indiana Public Service Commission, Arthur L. Gilliom, Attorney-General of Indiana, held that the City Council of Indianapolis had no authority to limit the power of the Public Service Commission, concerning the bus law under which the commission grants permits for the operation of bus lines. The question was raised in connection with a motion filed by the Indianapolis Street Railway to dismiss a petition by the Hoosier Transportation Company to take on and discharge passengers within the city limits. The motion of the railway points out that a city ordinance prohibits buses taking on or discharging passengers on streets used by interurban or street cars, unless the buses are operated by the street car or interurban companies. Mr. Gilliom said the commission alone had power to determine who might give service in such streets.

Council Versus Commission in Lincoln

The Lincoln Traction Company, Lincoln, Neb., has run against a snag in securing permission from the City Council to comply with authority received from the State Railway Commission to substitute bus for railway service on its Beach, South Fourteenth and North Tenth Street lines. The Beach line crosses a viaduct three blocks long over the tracks of the Burlington and the Union Pacific Railroads west of the city. The company started buses over this structure before it got the Council's permission. In the division of authority the state commission controls service and rates, while the city governs the use of streets. The Council wants the railway to give bond to replace or repair that portion of the structure used by it. The company asked that nothing be done until the end of the 90-day experimental period, but the Council finally demanded a $6,000 bond before it would permit buses to be operated by the railway, over the structure.

Jitney Operation Sought in Miami

Petitions for the repeal of the ordinance which rules jitney from downtown zones in Miami, Fla., and for the re-enactment of the previous ordinance were presented to the City Commission on Aug. 15. The petitions, containing 6,100 names and 4,200 names respectively, were filed with H. E. Ross, city clerk. Mr. Ross will check the names on the petitions against the list of voters. Under the old ordinance governing jitney operators, special permits and licenses were required as well as proof of the dependability of all drivers and motor vehicles used. Fifteen per cent of all registered voters must sign a petition for a referendum and 10 per cent for an initiative election for the passage of new ordinances.

Further Co-ordination in Westchester County

Leverett S. Miller, president of the New York, Westchester & Boston Railway, proposes to solve the transportation problem of Westchester County northward from White Plains through Brewster, N. Y., and Danbury, Conn., by the establishment of motor coach feeder lines, rather than by the extension of existing railway lines. Mr. Miller's opinion was contained in a communication to L. Ward Prince, president of Prince & Ripley, who had asked, on behalf of Westchester realtors, that the New York, Westchester & Boston extend northward its western division all-electric commuter service now terminating at White Plains. In his letter to Mr. Prince, Mr. Miller said:

You are familiar, I know, with the fact that this company originally contemplated the extension of its lines from White Plains to Brewster and Danbury. Within the last few years the company was faced with the obligation of completing its routes, both from Larchmont to Port Chester, and from White Plains to Brewster and Danbury within the time limit specified by law, or lose its franchise rights.

To accomplish this would have required the expenditure of many millions of dollars. The time did not seem propitious for the extension to Brewster and Danbury, but the extension from Larchmont through Mamaroneck, Harrison and Rye to Port Chester appeared warranted.

It was for this reason that the railway sought remedial legislation to relieve it of the obligation to build to Brewster and Danbury. At present-day prices it would cost to build these latter extensions double the estimate made at the time these lines were first considered.

In the meantime, much of the remaining undeveloped property to the south and east of White Plains has come into the market, and the growth to the north undoubtedly now will increase. But I do not believe that it is yet of sufficient extent to warrant a rail line such as was originally contemplated.

It seems to me that the more practicable solution of the transportation problem for this section is through the use of motor vehicles co-ordinated with the existing rail lines, to be followed later by the extension of the rail lines as soon as the traffic may warrant.

You refer to present-day values of land in this section and the very large increase that would result in values if transit facilities were furnished. Transportation must, to a certain extent, be a pioneer in such development, but it cannot carry the load for too long a period.

As you say, the property owners would be well repaid if they were to underwrite the cost of such an extension, but, as you also remark, they won't; they will expect the transit lines to carry the bag. The development through motor vehicle transportation would require far less investment, and consequently the underwriting by property owners in such an undertaking might be more favorably considered by them.

The working out of these problems requires the co-operation of realtors interested in the development of the section and those connected with the transportation companies. We all have a common interest in the development of the section which it seems cannot be efficiently accomplished without such team work.

Rights for Morris County Traction Company

Joseph P. Tumulty and Joseph K. Choate, receivers for the Morris County Traction Company, have been authorized by the Board of Public Utility Commissioners to substitute buses in place of trolley cars over the lines from Landing, Morris County, to Maplewood, N. J.

It is proposed to use 35 buses. A similar application was granted last year involving the company's line between Elizabeth and Springfield. By the application just granted five routes will be created for the company's buses. The fare will be 10 cents in each zone, the same rate as on the trolleys.

The bus service must be started within a reasonable time, the board ruled, adding that it reserved the right to order the removal of poles, overhead trolley wires and tracks and the replacement of pavements.

At the hearing on the application it was contended that permission to run buses would add value to the property of the company. Such a contention, the board held, was secondary to the question of providing adequate transportation. The decision said:

The board does not propose to approve these permits merely to permit the receivers or bondholders' committee to take advantage of that fact and to speculate with them, but will impose a condition that unless the buses are actually provided and that transportation is furnished over the route now covered by the trolleys the approval will be withdrawn.

Rehearing Sought on Albany Fare Grant

A petition for rehearing was filed with the Public Service Commission on Sept. 2 by Mayor John Boyd Thacher of Albany, N. Y., on the order of the commission adopted on Aug. 4 permitting a 10-cent fare to be charged by the Capitol District Transportation Company, Inc., on its bus lines. This company is a subsidiary of the United Traction Company. The rehearing petition alleges a number of particulars in which it claims the order was not warranted by the evidence taken in the case. It is expected that action on the city's application for rehearing will be taken at an early date. A similar petition has already been filed on behalf of the city of Cohoes.

Route in Minneapolis Changed

With an order from the Minnesota Railroad and Warehouse Commission to make a 12½-cent token fare for local travel on the Selby-Lake line of the Twin City Motor Bus Company in Minneapolis, Minn., the route is to be changed, according to suggestion of the commission, so as not to be in direct competition with the Selby-Lake interurban railway. A similar fare and rearrangement of bus route had already been ordered for St. Paul and the proposed new bus route had been approved by the City Council. The through fare and local cash fare is 25 cents. The company expects to increase the bus fleet on this line from fourteen to eighteen or nineteen.

The new route is ¾ mile longer in Minneapolis and four blocks longer in St. Paul, which will add about ten minutes to the running time between terminals. The Twin City Motor Bus Company is a subsidiary of the Twin City Rapid Transit Company.

Group or Party Buses in Reading

The Reading Transit Company, Reading, Pa., has in service two buses which are available to groups or parties for trips out of town. These buses of the latest type have a seating capacity for 29 people each. Application can be made to the transportation department for service and rates for trips within a 50-mile radius of Reading.

Wisconsin Patrons for and Against Buses

Sentiment of the people at a public hearing on the proposal of the Wisconsin Public Service Corporation to substitute bus service for the electric interurban service between Green Bay and Duck Creek, Wis., was equally divided for and against such substitution. Action was delayed until further evidence of the sentiment of that section could be obtained.

New Buses Operating in Milwaukee

Two new buses of the very latest type have been received and placed in service on the Lincoln Avenue line of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis. These buses are operated by twin engines. Each has a seating capacity of 40 passengers.

Hearing Held on Troy Bus Line

Public Service Commissioner Lunn held a hearing on Sept. 6 on the petition of the Capitol District Transportation Company, Inc., for a certificate of convenience and necessity for the operation of a bus line in the city of Troy, N. Y., which will be an extension of the present bus system of the company and will afford transportation facilities to a section of the city in which the United Traction Company, the parent company, proposes to abandon railway service. A hearing on the proposed abandonment of the trolley route in Fifteenth Street between Hoosick and Congress Streets was held before Commissioner Lunn at the same time as the bus application. There was no opposition to either application at the hearing. The decision of the commission will be announced later.

Buses for Local Service in Detroit

Effective on Oct. 1 the Detroit Municipal Railway, Detroit, Mich., will reduce the street car fare to Redford to 6 cents from 10 cents, making the former amount the prevailing fare throughout the city. Several new bus lines have been decided upon and express street car service will be instituted on Sept. 18 on a main artery in the easterly side of the city. The buses will stop at each block and will carry the loads to the next station at which the express street cars stop. A free transfer from the buses to the street cars will be given. Loading stations for the express cars will be built similar to safety zones, but will have canvas tops and sides. In the opinion of the general manager this may aid materially in reducing the number of accidents resulting from persons being hit while attempting to cross from curb to safety zone.

While the department has been figuring on instituting such service for several months it has not been deemed advisable to attempt high speed on Jefferson Avenue and other lines due to the condition of the tracks. The new roadbed has been completed in Jefferson Avenue and the express service will start there first. Construction gangs are now replacing the roadbed in Woodward Avenue and if the Jefferson project proves successful, the higher speed service will be used on the main artery. Del A. Smith, general manager, said:

The research which the department is conducting in connection with the co-ordination of street cars and motor coaches has convinced us that such a plan is not only entirely feasible, but highly desirable.

Mayor Smith said:

We all know that rapid transit in the form of subways cannot be achieved in Detroit for several years, and for that reason the D.S.R. is making every effort possible to speed up service. The day is past when we figure distance by miles; we figure it now by minutes and if the time required to carry passengers from one point to another can be reduced, the municipal system is benefitting its patrons.

The Street Railway Commission also approved coach service on the Six Mile Road between Woodward and Wyoming Avenues, and extension of the present service on the Seven Mile Road westerly from Wyoming Avenue to Lasher Road. Both these extensions invade territory annexed to the city during the past few years.

The commission also approved coach service on Schoener Road, between State Fair and Gratiot Avenues; and on Connors Avenue between Six Mile Road and Kercheval Avenue. Both lines will go into operation on Sept. 12. This service will be in force only during the morning and evening rush hours, but will be extended as traffic increases.

Buses for Kansas City, Kan.?

Buses of the single-deck type are proposed for operation in Kansas City, Kan., representatives of the Kansas City Public Service Company informed the city commissioners on Aug. 4, in executive session with Mayor McCombs of Kansas City. The buses would serve the districts in the north and west parts of the city that have no adequate transportation facilities. If the plan goes through the buses will be given a six months trial and would be continued if patronage justified the expense, it was reported.

Toledo Bus Ordinance in Abeyance

Enforcement of the new ordinance in Toledo, Ohio, against handling of intracity passengers by interurban buses has been held up through continued postponements in the municipal court of the 40 or more cases that have been initiated against drivers who violated the ordinance. The ordinance has been upheld by the courts of the state. Meanwhile the Community Traction Company has gone ahead with its city bus service for West Toledo, but is suffering from competition of interurban bus lines operating a few miles beyond the city limits.

Coach Service Extended in Wisconsin

Motor coach service, replacing interurbans on runs between Oshkosh and Fond du Lac and Oshkosh and Neenah, Wis., has been placed in effect by the Wisconsin Power & Light Company. Electric railway equipment will be retained, and the track will be used in emergencies or will be restored to regular use if the demands for service appear to justify it.

Ban on Parking Buses Lifted Partly

The peremptory order to interurban bus companies using the streets of New York City as terminals to find stations not on the public thoroughfares has been modified by Police Commissioner Warren, who extended the time limit indefinitely from Aug. 1 for lines which are building terminals but have been unable to complete them. With the opening of the Holland Vehicular Tunnel the commissioner believes there will be a great increase in interurban bus lines. Lines which have made no attempt to obtain terminals will receive summonses for obstructing traffic. Sept. 15 is the new date fixed in the ban against parking.

Financial *and* Corporate

Commission Hears St. Louis Reorganization Plea

The Missouri State Public Service Commission has under advisement the application of the St. Louis Public Service Company for approval of its plans for the reorganization of the United Railways properties in St. Louis, Mo. The new company recently purchased the United Railways holdings for $49,601,000.

United States District Judge Faris, who has jurisdiction over the receivership, has already approved the general plan of reorganization. The company is expected to emerge from receivership within 60 days.

The commission conducted a hearing on the application on Sept. 2. At this session it developed the new company plans to issue securities in addition to the $52,414,862 heretofore provided for, but specific plans for the additional financial obligations were not revealed at the hearing.

The commission also sought definite information concerning the cost of reorganizing the properties, but Stanley Clarke, counsel for the reorganization committee, stated that there is no way of finally estimating such cost at present. The expenses of the reorganization to date have totaled approximately $895,000, but that amount will be increased before the complete reorganization is perfected.

During the period of reorganization the committee has maintained offices in the Liberty Central Trust Building, St. Louis, and has employed a force consisting of three attorneys, two engineers, a secretary, stenographers and other office help. This force has taken no part in the operation of the company under the receivership, which has been in charge of Rolla Wells and Col. Albert T. Perkins, his general manager.

Counselor Muench for the city took the position that the application of the new company was premature and too indefinite and that under it the commission could only issue an "If and when order." He cross-examined all witnesses for the company.

Walter E. Bradley, secretary of the reorganization committee, testified that the majority of the holders of securities of the old company had approved the reorganization plan. He estimated the percentage of assent as follows: Transit company securities, 99.76 per cent: Suburban company bondholders, 87 per cent; United Railways preferred stock, 96 per cent, and United Railways common stock, 89 per cent. All classes of security holders will participate in the readjustment of the company's financial structure and none of the securities to be issued by the new company will be sold to the general public. He said that all of the stock of the new company has been subscribed by the present security holders.

The new stock will include 73,193 shares of preferred and 342,645 shares of common. Of the preferred stock 19,000 shares will be used to pay off unsecured claims against the old company on the basis of 66⅔ per cent if such stock is accepted in payment. If not, the claims will be paid off on the basis of 33⅓ per cent in cash. Mr. Bradley said that with the exception of the city of St. Louis, all of the unsecured claim holders have elected to accept stock in payment. Such claims total $466,471. The testimony developed that no funds have been set aside to take care of the mill tax judgment.

The new company will have total bonds of only $40,800,000 as against $54,890,000 of bonded indebtedness of the United Railways. New bonds to the amount of $4,500,000 will be issued at this time to refund a like amount of Suburban company bonds. Mr. Clarke testified that the cash in the hands of Receiver Wells would not reach the estimate of $4,500,000 made when the committee first announced its reorganization plans in October, 1924. The total amount of cash now in the hands of Receiver Wells was not revealed at the hearing, and it was stated the probable deficit in cash for the reorganization could not be definitely estimated at present. Mr. Clarke said:

We probably will have to ask the commission for authority to sell additional preferred stock or prior preferred stock, or some short term notes to make up the deficit in the cash requirements of the plan.

A shrinkage of earnings during the last three years accounts for the lower amount of cash held by the receiver.

Later it was estimated the company would require at least another $900,000 in addition to the cash now available.

The total securities of the new company including bonds and stocks will be $52,414,862 compared with $93,886,000 in securities of the old company now outstanding. The $16,383,000 in preferred stock and $24,913,000 common stock of the United Railways were eliminated in the reorganization plan.

New Owners in Beacon

The Fishkill Electric Railway, controlled by the Central Hudson Gas & Electric Corporation, has relinquished the Beacon, N. Y., railway system to a local syndicate headed by Attorney James G. Meyer and Mayor Macomber. The line covers 7 miles. The fare is 7 cents with no transfers. It is stated that the operating company might find the burden of Main Street paving somewhat burdensome and complications might develop affecting adversely the future of the trolley.

Traffic, Fare and Wage Figures

Traffic on the electric railways continued to fall off during July, compared with July, 1926. The decrease was the heaviest of any month in 1927 thus far. The number of revenue passengers, including bus passengers, reported to the American Electric Railway Association by 219 companies for July, 1927, compared with July, 1926, is as follows:

July, 1927	773,232,934
July, 1926	803,981,889
Decrease, per cent	3.83

Average cash fares in cities of 25,000 population and over:

	Cents
Aug. 1, 1927	7.9223
July 1, 1927	7.8966
Aug. 1, 1926	7.6946

Average maximum hourly rates paid motormen and conductors in two-man service by companies operating 100 or more miles of single track:

	Average Hourly Rate Cents	Index Number 1913-100 Per Cent
Aug. 1, 1927	57.23	210.02
July 1, 1927	57.19	209.87
Aug. 1, 1926	56.87	208.70

Dispute Over Applicability of Funds for Income Bond Payment

Thomas B. Jenkins, of Richmond, Ind., owner of $35,000 par value adjustment mortgage 5 per cent income bonds of the Third Avenue Railway, New York City, is bringing suit in federal court to compel it to pay full 5 per cent interest and 27½ per cent accumulated back interest and to prevent it from going into the bus business until the bonds are paying full interest and the accumulation is wiped out. Suit will be brought on behalf of himself and all other bondholders, but Mr. Jenkins has already filed a suit in state court, asking that the company be compelled to pay interest due on his bonds. In urging others to join him Mr. Jenkins issued this appeal:

On Oct. 1, 1927, a total of 30¾ per cent interest will be due on the adjustment mortgage 5s, amounting to $6,836,000. Of this accrued interest 1¾ per cent, or $275,000, has been ordered paid, leaving an arrearage of $6,561,000, or 29¾ per cent.

According to the company's published reports, full interest of 5 per cent has been earned on the adjustment 5s in the past two fiscal years, with a surplus, after interest, of around $300,000. Only 2¾ per cent has been paid or ordered paid in each of these two years.

According to the same reports, the surplus income of the company available for the payment of interest on these bonds accumulated since 1917, but unpaid, is approximately $4,500,000, or 20 per cent on the outstanding bonds.

The company has been operating bus lines in Westchester County and, not only are said bus lines operating unprofitably, but they were financed out of the company's treasury with funds which legally belong and should have been paid to the adjustment bondholders. Officers of the company admit that they contemplate an extensive bus venture in the Bronx, requir-

ing considerable further capital. This venture, they also admit, will probably prove unprofitable. The financing of this venture, they state, is to be accomplished through the hypothecation of securities now held in the company's treasury, which were bought with cash from the company's treasury, and which I am advised by counsel ought to be applied to the interest due the adjustment bondholders.

As an owner of the adjustment mortgage bonds, I have employed counsel to estop the company from using the property of these bondholders for capital purposes, in direct violation of the trust indenture securing the bonds, and also to bring legal action against the company, to force it to pay the earned but withheld interest on the bonds.

My attorneys are Barber, Fackenthal & Giddings, 120 Broadway, and I hereby invite all owners of these bonds to join with me in an association for mutual protection.

No deposit of bonds will be required. Please communicate with me in care of my said attorneys or with said attorneys. Telephone—Rector 4573.

A statement by the company says:

The past year has been an eventful one for the companies of the Third Avenue Railway System. Much of the uncertainty as to the future, occasioned by threatened bus competition has been cleared up and the future never seemed more assured or brighter.

Operations for the year ending June 30, 1927, showed approximately $250,000 above 5 per cent on the adjustment bonds. This showing was abnormal in the respect that there was a substantial increase in receipts and in net due to the Interborough strike which occurred during that year, temporarily diverting travel to the Third Avenue lines.

It has been necessary in order to avoid the sale of securities at a sacrifice to finance all the operations of the companies for the last ten years out of surplus.

During the past year among other extra disbursements approximately $300,000 was paid on account of paving bills of previous years which has been in litigation and also it was necessary to pay $350,000 on account of capital expenditures, making approximately $650,000 paid out of the year's surplus for expenditures not chargeable to operating expenses.

At the present time the companies of the system have in the treasury available for all purposes approximately $1,500,000. This is outside of its own securities which were bought and placed in its treasury more than ten years ago.

From this it will be seen that although the future of the companies of the system seems assured, the cash available for all purposes has not been increased during the past year. Under the conservative policy which has characterized the management, it is advisable to conserve this cash surplus. This is more urgent by reason of the increase of wages that has been going into effect during the past few months.

Traffic Increase in Toronto

Transportation Commission's report covering operation of municipally-owned system sees improvement in general business reflected in the operations for the year 1926

IN ITS fifth annual statement covering the operations of the year ended Dec. 31, 1926, the Toronto Transportation Commission, Toronto, Ont., points out that the surplus of $76,951 was slightly more than one-half of one per cent of the gross revenue. The accumulated surplus as of Dec. 31, 1926, was $248,371.

The gross income was $12,050,304, an average of more than $1,000,000 a month and the largest in the history of the commission. The increase over 1925 was partly due to the increased development of motor coach traffic and partly to an improvement in general business conditions in the Toronto district. The revenue passengers were 183,494,076, a gain of 2,714,151 over 1925, but the total number carried for 1926 was still more than 5,500,000 passengers below the record established in 1923.

The investment in capital account, as of Dec. 31, 1926, was $45,350,484. Capital expenditure in road and equipment totals $39,374,813 as of Dec. 31, 1926. The net additions to the property accounts during the year were slightly more than $600,000, all of which were financed by the commission without increasing the debenture debt and without disturbing the invested capital funds held in trust for the commission by the City Treasurer.

The amount carried on the books classified as "Franchise and Other Intangible Assets" now stands at $4,375,449 as of Dec. 31, 1926. This item has been referred to at length in reports of previous years. The amount represents payments the city has been forced to make for the property of the Toronto Railway in excess of any reasonable valuation and for franchises and rights of certain radial railways which previously operated within the city limits. In line with the policy adopted by the commission in 1925, this large item is being amortized as rapidly as conditions will permit.

The commission in 1925 applied $941,941 of the accumulated reserves toward the reduction of the intangible assets. In view of the small additions to the capital accounts and the fact that no large replacements will be necessary in the near future, it was possible to make a further reduction of these assets and an additional amount of $834,844 was therefore applied to this purpose in 1926. During the last two years the intangible assets have been reduced by $1,776,785.

The reserve for replacements, as of Dec. 31, 1926, amounts to $2,811,412. In the revenue accounts for 1926 there has been appropriated from net income the sum of $998,911 for the purposes of this reserve. The net funded debt less funds transferred to the City Treasurer for redemption of debentures is $39,640,679 as of Dec. 31, 1926, a reduction of more than $1,000,000 from the position at the close of the year 1925.

The operation of motor coaches, which was commenced in May, 1925, has been greatly extended during the past year. A total of $132,008 was obtained from this source in 1925. In 1926 the gross income was $300,811. There has been a surplus each year from the operation of motor coaches.

Various classes of service which were operated in 1925 were continued in 1926, including sight-seeing trips, the chartering of motor coaches to private parties, coach transportation to the race tracks and to the Canadian National Exhibition, transportation of school children, and a regular scheduled service to the "Hill" district. In addition, there was inaugurated in July a regular service between Toronto and Niagara Falls. All of these services, which are operated as a separate undertaking and distinct from the street railway and bus transportation, have proved to be very popular, although the rates charged are in all cases necessarily in excess of the rates charged on the street railway. As many as 49 coaches have been chartered in a single rental contract.

Operating expenses of the commission for the year 1926, including the cost of electric current, maintenance, repairs, administration and taxes, but exclusive of the operation of motor coaches, amounted to $7,297,367. This total compares with $7,292,298 in 1925.

The Transportation Commission purchases all the power for operation of the railway from the Toronto Hydro-Electric System, which in turn purchases from the Hydro-Electric Power Commission of Ontario. The average cost of power to the Transportation Commission, converted and delivered as direct current was 1.40 cents per kilowatt hour in 1926. The aggregate amount paid for purchased power was $1,077,277.

Annual charges for interest and sinking fund on the debenture debt increased in 1926 approximately $125,000 over the requirements of the year 1925. In addition, it was necessary to appropriate a large amount for the replacement reserve. The large annual increases in the debt charges, which have been referred to in previous reports, will not continue beyond 1926 unless the commission is obliged to increase the debenture debt. A policy to which the commission has consistently adhered since the commencement of operation is that extensions or additions to the system should not be made unless they will earn sufficient additional revenue within a reasonable period to meet all the expenses of operation and fixed charges on the new capital. If extensions are made without regard to economic considerations, the fare will inevitably have to be increased.

The expenses of operation of motor coaches totaled $211,548, resulting in a net income of $89,262, which was more than sufficient to meet all fixed charges on the capital invested including an adequate allowance for depreciation.

The mileage operated by street cars and buses, but not including motor coaches, aggregated 25,533,893 miles in 1926, an increase over the mileage in 1925 of 286,835.

COMPARATIVE OPERATING STATEMENTS OF THE TORONTO TRANSPORTATION COMMISSION

Gross Income	
1921*	$4,071,969
1922	11,651,512
1923	11,852,334
1924	11,709,695
1925	11,626,658
1926	12,050,304
Operating Expenditures	
1921*	$2,499,773
1922	8,468,841
1923	8,104,680
1924	7,788,563
1924	7,387,570
1926	7,508,915
Net Income	
1921*	$1,572,196
1922	3,182,670
1923	3,747,654
1924	3,921,131
1925	4,239,087
1926	4,541,388
Interest and Redemption of Debt	
1921*	$642,805
1922	1,837,977
1923	2,387,725
1924	2,733,385
1925	3,081,703
1926	3,273,045

* Four months.

The largest adjustment in the surplus account during the year was the transfer of $193,638 to the reserve for replacements. The report states that if sound business principles are to be followed, it is imperative to create proper reserves and to amortize the relatively large amount of intangible assets before accumulating any substantial surplus.

During the year 1926 the average fare collected on the Toronto Transportation System was 6.16 cents. Its distribution was as follows:

	Cents per Passenger	Per Cent of Cost
Maintenance of track work, overhead and structures	0.366	5.93
Maintenance of equipment	0.506	8.21
Power	0.653	10.58
Operation of cars and buses	2.139	34.72
Tickets and transfers	0.040	0.65
Insurance	0.030	0.48
Taxes, legal and miscellaneous expenses	0.091	1.50
General offices and accounting	0.137	2.23
Interest on and redemption of capital and replacements	2.200	35.70
Totals	6.162	100.00

Revenue from sundry other sources, amounting to 0.217 cents per passenger, provides the additional amount required to make up the full allowance necessary for replacements and other operating reserves.

Track extensions built in 1926 were 1.561 miles and track removed in 1926 was 0.713 mile. This made a net addition to trackage in Toronto during 1926 of 1.388 miles.

No new large buildings were constructed during the year. The most important work carried out was an alteration of the paint shop at the Hillcrest property so that a modern and economical system of spray painting could be installed. During the year the last of the three storage batteries which the city was obliged to purchase from the Toronto Railway became useless and the Commission disposed of the equipment at scrap values.

The commission owns 972 passenger street cars, 82 electric service cars, 122 buses and coaches, and 39 motor trucks. All of this equipment is maintained in good operating condition and is used in regular service. The reconstruction work on the cars originally acquired from the Toronto Railway was completed during the year. On Dec. 31 1925, there were 98 pay-as-you-enter cars still remaining to be rebuilt. Of these 32 were converted into pay-as-you-leave cars, and 66 were converted for two-car train operation. Nine additional motor coach bodies were built at the Hillcrest Shops in 1926.

The commission continued operation of the street railways in the Township of York and Town of Weston during the year under the special operating agreements which have been referred to in previous reports. These agreements impose no financial obligations on the Commission.

In concluding his statement General Manager Harvey said that the outstanding feature in connection with the operation for the year 1926 was the improvement in traffic, which was most encouraging after the decrease in passenger revenue experienced in 1924 and 1925. The fundamental need of the system was more business. Without increased revenue it was impossible to justify further extensions.

COMPARATIVE STATISTICS ON REVENUE PASSENGERS OF TORONTO TRANSPORTATION COMMISSION

(City Fare System)

Year	
1921*	61,870,213
1922	187,145,261
1923	189,143,145
1924	185,203,698
1925	180,779,925
1926	183,494,076

* Four months.

Month	1925	1926
January	16,314,899	15,687,830
February	15,065,782	15,067,733
March	16,020,330	16,487,826
April	14,904,316	15,177,829
May	14,922,004	15,224,681
June	14,367,817	14,588,118
July	13,441,204	13,930,141
August	13,643,436	13,976,569
September	15,410,594	15,616,925
October	15,393,333	15,423,929
November	15,133,421	15,504,898
December	16,162,789	16,807,597
Totals	180,779,925	183,494,076

It was his opinion that proper coordination of the transportation services of any large city to provide adequate and convenient facilities should include regular and reliable service to important centers outside. At the present time several million passengers per year were transported into and out of Toronto by interurban buses. He said the report of the Motor Bus and Truck Committee of the Canadian Electric Railway Association, adopted by the association in 1927, very definitely stated the situation as follows:

It is becoming more and more apparent that the operation of automotive vehicles by the transportation agency of any given area should not be confined strictly to the geographical boundaries of such area. For the street railway system of a city to sit meekly by while others pre-empt all profitable interurban or suburban routes under conditions amounting in practice to perpetual franchises on such routes, spells disaster in the long run to any such system. It involves a constantly increasing loss of local fares to such through-running buses, the creation of a net-work of outside franchises stifling and forbidding the normal growth and development of the local system, the occupancy by others of a field logically belonging to such system and necessary to the economical development of its urban services, and a substantial and pronounced loss of prestige and local favor.

In the report appears this statement:

One of the most difficult conditions your commission has to meet is the constant demand for extension of its rail lines and bus services into localities from which practically no additional revenue can be derived. While your commission recognizes its obligations as a publicly owned utility to provide city-wide service, yet it must have regard for fundamental economic considerations if the present rates of fare are to be maintained. The revenue from the universal fare system has varied only slightly from year to year. The problem of administering the system would be greatly simplified if there were a moderate and consistent yearly increase in revenue.

COMPARATIVE STATEMENT OF EARNINGS OF TORONTO TRANSPORTATION COMMISSION

	1925	1926
Income:		
Passenger earnings:		
Railway and bus transportation	$11,157,893	$11,362,690
Motor coach transportation	132,008	300,811
Income from sundry other sources	336,757	386,802
Gross income	$11,626,658	$12,050,304
Expenditure:		
Cost of electric current, including operation and maintenance of substations	$1,108,942	$1,173,581
Expenses of operation, maintenance, repairs, administration and taxes, including accrued charges	6,183,356	6,123,786
Expenses of operation—motor coaches	95,271	211,548
Total expenditure	$7,387,570	$7,508,915
Net income available for fixed charges	$4,239,087	$4,541,388
Fixed Charges:		
Interest	$2,207,819	$2,233,494
Reserves on capital account:		
Redemption of debenture debt	873,883	1,039,550
Reserve for replacements	909,352	998,911
Reserves on operating account:		
Reserve for workmen's compensation and public liability	126,968	132,480
Reserve for contingencies	50,000	60,000
Reserve for doubtful debts	13,000	.....
Total fixed charges and reserves	$4,181,024	$4,464,437
Net income carried to surplus	$58,063	$76,951

Book Reviews

History of the Incandescent Lamp

By John W. Howell and Henry Schroeder. The Maqua Company, Schenectady, N. Y. 208 pages.

So that the present generation may have some idea of the design, manufacture and development of the lamp business this history has been written with numerous illustrations to portray the changes in this industry. Something of the romantic era of electric lighting prior to Edison's invention is described so that the reader is in a receptive frame of mind for the introduction of the battery, the ampere and dynamo. The authors in the preface pay tribute to Thomas A. Edison, whose incandescent electric lamp "is the foundation stone upon which the electric light and power industry of today has been built."

Year Book on Commercial Arbitration in the United States, 1927

Prepared by the American Arbitration Association, 342 Madison Avenue, New York City. Published, 1927, by Oxford University Press, American Branch, 35 West 32d Street, New York City. Cloth, 6x9½ in., 1,152 pages. Price $7.75, postpaid.

This is the first of a series of standard publications on arbitration being prepared under the direction of the Research and Publications Bureau of the American Arbitration Association. The association is a voluntary educational organization, supported by dues and contributions. It serves business through the promotion of arbitration to eliminate the notorious delay, expense and bad after effects of litigation. It acts as an educational body, as an agency to assist other bodies in setting up effective machinery for arbitration and as a practical tribunal where members and friends of arbitration may arbitrate their disputes speedily, justly and at negligible cost.

The body of the book is a complete outline of the existing arbitration arrangements in practically every important industry. Each industry is treated separately with details of the arbitration procedures now in use by its various societies and trade associations. This treatment by industries is followed by a description of the arbitration rules of the U. S. Chamber of Commerce, the International Chamber of Commerce and local chambers all over the United States.

With the aid of name and subject indexes the busy executive can quickly locate those sections relating to arbitration as it exists today in his particular industry or field of work. He will find specific data, names and addresses of organizations, forms and rules of procedure with which he can easily chart a practical course of action. If this book leads to a more general understanding and acceptance of the economies of commercial arbitration it will help eliminate one of the most glaring wastes in modern industry.

Business Cycles and Business Measurements

By Carl Snyder. New York, N. Y.: The Macmillan Company. 326 pages. Price, $6.

The striking variations in the fluctuations of trade, from prosperity to crises and depression which we have come to call "business cycles," have had in the United States a greater intensity and, therefore, arouse deeper interest than in perhaps any other country, and many attempts have been made to determine definitely the extent and regularity of this movement. But it is only in recent years, and largely following the great burst of interest aroused during the war, that the material has been available to make such definite measures. In this book the author has sought to put together this wealth of new material and from it derive measures of business from month to month, one of which is a wide composite of a weighted average of 56 independently computed series

Others have been found in close agreement with this broad combination, and building upon these foundations and the relationships therein established it has been possible to carry back several measures of trade through more than half a century. These measures seem to show that the crises associated with the business cycle reached their intensity in the latter part of the nineteenth century, and has since been of distinctly lessened severity. But the course of these fluctuations is of wide import and it is of deep interest to the business man, especially, to know just what is the current position of industries and trade with reference to that persistent and never-ending growth. These new measures of trade and productive activity are set forth graphically in a series of more than 40 full-page charts.

Wages in the United States, 1914-1926

New York, N. Y.: National Industrial Conference Board. Price $2.50.

The new volume on wages affords a comprehensive picture of wage conditions and movements in all important occupational fields. Particular attention has been given in the present study to the relation of the wage situation during 1926 to business and industrial conditions during that year. The very pronounced stability and relatively high level of wages during the past three years in the face of declining prices is dealt with as one phase of present conditions especially worthy of study. A novel note is struck by the report in the declaration that the contents of the wage earner's envelope in many instances no longer represent his sole income. Bonuses based on production, quality of work, on attendance, promptness or long service; profit sharing, employee stock ownership, pensions, health, accident and group insurance and, in some cases, unemployment insurance, co-operative purchasing plans, industrial housing and transportation at less than commercial rates are some of the benefits cited as examples of supplements to wage incomes. This new study of the Conference Board covers wages in agriculture, in the public utilities, in the building trades and on the railroads, as well as wages in 25 important manufacturing industries. The text is well fortified with many tables and charts covering the period 1914 to 1926, inclusive.

Directory of Commercial Testing and College Research Laboratories

Bureau of Standards, Department of Commerce, Washington, D. C. 39 pages. Price, 15 cents.

In recognition of the desirability under present conditions of independent commercial testing service, and in anticipation of the marked increase in the demand for such service in both domestic and export trade, there has been compiled by the National Bureau of Standards a list of laboratories throughout the country that are prepared to test various kinds of commodities, to determine whether or not they can apply to its customer's purchase specifications. In accordance with the law, the National Bureau of Standards makes tests and carries out investigations for other government departments. It is impracticable for the bureau to make tests for private individuals if other laboratories can do the work. To inform interested persons of the location of other laboratories the bureau has compiled a list of 207 commercial testing laboratories throughout the country, together with indications of the types of commodities which they are prepared to test. To accompany the list of commercial testing laboratories there has been compiled a list of 143 colleges which are used not only for the purposes of instruction but also to a considerable extent for research work.

For the purpose of minimizing the disadvantages incident to the use of specifications, the bureau has started a so-called "Certification Plan," in accordance with which there is compiled a list of manufacturers who have expressed their desire to supply material complying with certain selected nationally recognized specifications and willing to certify to the purchasers upon request that the material thus supplied is guaranteed to meet the requirements and tests of specifications. This plan has already been applied to 48 United States government master specifications. Copies of any of the 48 lists of manufacturers, to which additions are being made from time to time, can be obtained upon request.

Personal Items

J. H. Lucas Heads Transportation Section

General superintendent of rolling stock at Milwaukee honored by the Wisconsin Utilities Association

J. H. LUCAS, elected chairman of the transportation section of the Wisconsin Utilities Association at its convention in August, is just completing his twentieth year in the car building and maintenance industry. He has spent half of that time with the Pullman Company and the last ten years with the Milwaukee Electric Railway & Light Company. At present he is general superintendent of rolling stock at Milwaukee.

J. H. Lucas

When Mr. Lucas, fresh from high school, entered the Pullman company's shops as a template maker apprentice, all cars were made of wood. Among the company's products were many cars for elevated and subway operation, to say nothing about the cars for steam railroad service.

Among important developments at Milwaukee since Mr. Lucas has been there are the placing in service of the three-truck, articulated train and the double-truck one-man or two-man safety car which succeeded the single-truck safety cars of 1917 and 1918. The larger car, about 45 ft. in length, designed and built in Milwaukee, was put in service in March, 1920. About five years ago a five-year program of rehabilitation of interurban equipment was begun by the Milwaukee Company and since 1919 the rolling stock department has been called upon to meet the problems incident to the operation of buses and those that have arisen in connection with the operation of garages.

As superintendent of rolling stock, Mr. Lucas has developed a very complete system of inspection service and has charge of a shop layout which probably has more modern mechanical equipment and labor-saving devices than any other shops of similar size in the country. His department looks after 800 local cars, 100 interurban cars, 150 buses and 400 other vehicles including work cars, trucks and automobiles.

The outlook of Mr. Lucas with respect to the present and the future design of both cars and buses was perhaps reflected best in the paper which he presented before the transportation section of the Wisconsin Association at the recent meeting in Milwaukee and reprinted in ELECTRIC RAILWAY JOURNAL for Sept. 3, page 391.

Changes Made on Indiana Property

The Indiana Service Corporation, Fort Wayne, Ind., announces the appointment of M. M. Herrell as traffic agent with headquarters at Longansport. Mr. Herrell will represent the traffic department in all matters pertaining to freight and passenger business in Peru, Logansport, Delphi, La-Fayette and intermediate towns. He was passenger and freight agent at Wabash for several years. This appointment was made necessary by the increase of business in the towns mentioned and by the desire to have a thoroughly trained traffic man available for patrons at all times.

Marvin Erb, passenger agent at Peru, has been promoted to passenger and freight agent at Wabash to take Mr. Herrell's place.

W. F. See, who was Mr. Erb's assistant at Peru, has been appointed passenger agent at Peru.

Market Street Men Receive Promotions

Five appointments of general interest have been announced by Samuel Kahn, executive vice-president of the Market Street Railway, San Francisco, Cal.

J. W. Delaney has been named superintendent of equipment and his assistant will be C. D. Miller. Both of these men received training in the company's shops under J. M. Yount, who has been elected to the office of vice-president in charge of equipment and maintenance, a new position created to provide technical administration of shops, tracks, cables, overhead lines and substations. Mr. Yount has served as superintendent of equipment of the company since 1910. Mr. Delaney has been assistant to Mr. Yount since 1924 and Mr. Miller has served as inspector of equipment since 1919.

E. H. Lincoln is the new superintendent of the Geneva division. He has occupied a similar post at the McAllister division since 1924. The post vacated by Mr. Lincoln will be filled by P. O'Marie, who for six years has been superintendent of ferry terminals.

T. B. Gavin Auditor at Dayton

Man of wide experience in accounting practices named to interurban recently reorganized

T. B. GAVIN is auditing the books and accounts of the recently rehabilitated Cincinnati, Hamilton & Dayton Railway, Dayton, to which he brings a somewhat varied experience in general accounting work. It was while representing Arthur Young & Company on an audit of the accounts of the Dayton property that he attracted the attention of the officials of that line who later appointed him auditor.

T. B. Gavin

In his early youth at Chicago Mr. Gavin was affiliated with the Stock Yards Company and the Chicago Junction Railway, the former handling all the livestock that went to the Chicago market and the latter transporting the stock in its last interline movement. The accounting for this entire group of interests was handled in one office and was directed by the famous railroad accountant, Charles C. Chace. From the lowly post of voucher clerk in this organization of more than 100 persons to that of assistant to the comptroller he advanced all in the space of four years. He was also appointed auditor of the Electric Light & Power Company, which was a member of this group of interests.

His advancement was accelerated by his night school attendance and graduation from Business College, and his attendance at the LaSalle Extension University, where he took up higher accounting and business management. The knowledge thus gained was soon reflected in his work, and when the war came he was placed in charge of the task of preparing the consolidated income tax return of the allied interests. About that time the railroads were taken over by the government and Mr. Gavin was given the job of directing the accounting of corporate interests of the Chicago Junction Railway and also those of the Chicago River & Indiana Railway. After the war he was appointed income tax auditor for the Revenue Department but preferred to enter the public accounting field.

Later he entered the manufacturing field as auditor of the Illinois Tool Works, Chicago, maker of high-speed tools for the automotive industry

Nor does this enumerate the many contacts which Mr. Gavin made before his signing with the Dayton railway property. He became general manager of a large manufacturing house and still later installed a general accounting system in Mandel Brothers, accomplishing this work with the co-operation of the then comptroller, John F. Ruffner, now assistant to the president of the "Fair," Chicago, America's foremost exponent of the retail system of inventory and authority on department store accounting.

Mr. Gavin was born in Ottawa, Ill., where he received his early education.

Department Heads in Oakland Are Made Vice-Presidents

Careers are reviewed of men recently advanced to executive posts by Key System Transit— Each man a specialist of wide experience

FURTHER reorganization of the forces of the Key System Transit Company, Oakland, Cal., was made recently at a special meeting of the board of directors. Four departments were created, each headed by a vice-president, to constitute, with Alfred J. Lundberg, president, the operating force of the company.

The new vice-presidents are: James P. Potter, in charge of operation; H. P. Bell, in charge of engineering; C. C. Vargas, in charge of finance; and Paul Goldsmith, in charge of public relations. Each of these four men formerly bore the title of manager of his department, but they were elevated to the rank of vice-president in accordance with the new president's plan of co-ordination.

Paul Goldsmith

James P. Potter

C. C. Vargas

C. O. G. Miller remains as chairman of the board of directors and Lester S. Ready, recently resigned as president, is vice-chairman.

J. P. Potter, for many years superintendent of transportation, is now head of the operating department. He will have charge of ferry, bus, car and train operation. He is one of the oldest officials in point of service in the Key System and is one of the best known railway executives in the country.

C. C. Vargas, head of the financial department, is one of the youngest Key executives. He was formerly assistant to C. O. G. Miller when the latter was president. Mr. Vargas, under the new arrangement, will have supervision of all financial matters, including auditing, accounting and purchasing. He entered the service of the Key System in July, 1912, as payroll extension clerk in the auditing department, at a salary of $35 a month. After occupying various positions, he resigned as chief clerk in that department in July, 1918, to become auditor with the capital issues committee in Washington, D. C. When this committee dissolved in December, 1918, Mr. Vargas was made disbursing officer for the War Risk Insurance. There he remained until July, 1920. He then returned to California as auditor for the Mercantile Trust Company. In January, 1922, he reentered the service of the Key System as comptroller, being made assistant to the president on March 16, 1925, in addition to retaining his duties as comptroller. Mr. Vargas was born on Dec. 25, 1892, in Lemoore, Kings County, Cal. He attended grammar and high schools in Nevada. Returning to California, he entered the University of California night school and took courses in accounting and in finance.

Paul Goldsmith, manager of public relations and advertising, is a former Oakland newspaper man. Since he has been in office there has been an era of better feeling between the newspapers and the railway than existed in the past.

FRANK BENNETT, senior supervising inspector of transit for the Board of Transportation of New York, has retired on a pension under the retirement plan in effect for city employees. His associates in the city service honored him recently at a dinner attended by more than 100 of his fellow workers. Mr. Bennett, was the first dispatcher and trainmaster in charge of the electric operation of the southern division of the old Brooklyn Rapid Transit system. He had taken up railroading when he left City College and had been brakeman, towerman and dispatcher on the Delaware, Lackawanna & Western, the Sante Fe and the Union Pacific before he joined the company in Brooklyn. He entered the service of the original Public Service Commission in 1907 as a transit inspector.

OBITUARY

Hugh McCloskey

Notable among the achievements of Hugh McCloskey, beloved citizen of New Orleans, La., who died recently, was the rehabilitation of the New Orleans Railway & Light Company. When in the early years of the present century the transportation system in that city had reached its low point he was urged to come to the rescue, accept its presidency and put it on its feet.

Mr. McCloskey's active connection with the affairs of the New Orleans Railway & Light Company and the American Cities Company, by which the New Orleans Railway & Light Company was controlled, dates from March, 1908, when he was elected chairman of the board of directors of the latter company. Later he was elected president and the position of chairman of the board was abolished. Following the completion of the construction program which he laid down for the company in New Orleans, Mr. McCloskey relinquished the office of president and again became chairman of the board and in addition president of the American Cities Company. He relinquished these posts in 1915.

Among the improvement projects effected during his administration was the placing of the Carrollton Avenue and City Park Driveway tracks in neutral ground so as not to interfere with the street paving, and the authorization of the construction of a new line out to St. James Avenue to Milneburg. Under his administration Spanish Fort was purchased and converted into a pleasure resort, the railway being built to that point. The company stood half the expenses with the New Orleans Land Company in building a driveway to Spanish Fort.

In the midst of his utility activity is another story of his financial, business and social interests. Some years ago Mr. McCloskey received the New Orleans *Picayune's* loving cup for his public-spirited efforts in giving the city its wharves and sheds.

Manufactures *and the* Markets

Exhibit Committee Asks Co-operation in Bus Exhibit Placing

Because expense may be incurred to bus and truck exhibitors if they do not deliver their exhibts at the Cleveland Auditorium in time, a special bulletin was mailed on Sept. 3 by Fred C. J. Dell, director of exhibits, urging that all parties concerned adhere strictly to the appended schedule:

SCHEDULE COVERING ARRIVAL OF ALL AUTOMOTIVE VEHICLES TO BE SHOWN AT THE 46th ANNUAL CONVENTION OF THE AMERICAN ELECTRIC RAILWAY ASSOCIATION

Exhibitor's Firm Name	Space Numbers	Buses, Chassis and Trucks to Arrive
American Car & Foundry Motors Company	620 to 625, inc.	Sept. 29 bet. 9 a.m. and 12 noon
Baker-Raulang	667 and 668	Sept. 28 bet. 9 a.m. and 12 noon
Bender Body Company	669–670–671–672–673	Sept. 28 bet. 9 a.m. and 12 noon
Commercial Shearing & Stamping Company	664	Sept. 29 bet. 1 p.m. and 5 p.m.
Fitzjohn Manufacturing Company	406 and ½ of 405	Sept. 28 bet. 1 p.m. and 5 p.m.
Fremont Metal Body Company	452 and 454	Sept. 28 bet. 9 a.m. and 12 noon
Graham Brothers	665 and 666	Sept. 28 bet. 1 p.m. and 5 p.m.
Gramm Motors	663	Sept. 29 bet. 1 p.m. and 5 p.m.
International Harvester Company	422–423–424	Sept. 28 bet. 1 p.m. and 5 p.m.
International Motor Company	448	Sept. 29 bet. 9 a.m. and 12 noon
The Lang Body Company	449	Sept. 28 bet. 1 p.m. and 5 p.m.
Mack-International Motor Truck Company	443–445–447	Sept. 29 bet. 9 a.m. and 12 noon
Mack Motor Truck Company	442–444–446	Sept. 29 bet. 9 a.m. and 12 noon
Mack Trucks, Inc.	441	Sept. 29 bet. 9 a.m. and 12 noon
Murray Corporation of America	425–426–427–428	Sept. 28 bet. 9 a.m. and 12 noon
Reo Motor Car Company	404 and ½ of 405	Sept. 28 bet. 1 p.m. and 5 p.m.
The Six Wheel Company	600–601	Sept. 29 bet. 1 p.m. and 5 p.m.
Saf-T-Cab Corporation	453 and 455	Sept. 28 bet. 9 a.m. and 12 noon
Studebaker Corporation of America	473–474–475	Sept. 28 bet. 1 p.m. and 5 p.m.
Versare Corporation	476	Sept. 28 bet. 1 p.m. and 5 p.m.
Twin Coach Company	468–469–470–471–472	Sept. 29 bet. 1 p.m. and 5 p.m.
Walter Motor Truck Company	604–605	Sept. 28 bet. 9 a.m. and 12 noon
The White Company	657 to 662, inc.	Sept. 29 bet. 1 p.m. and 5 p.m.
C. H. Will Motors	495–496–497	Sept. 29 bet. 1 p.m. and 5 p.m.
Yellow Truck & Coach Manufacturing Company	414 to 421, inc.	Sept. 29 bet. 9 a.m. and 12 noon

"It is not considered necessary," Mr. Dell said, "to dwell upon the importance of this schedule being observed. If your equipment does not arrive when scheduled, inconvenience is caused other exhibitors and it may be necessary for you to pay an extra charge in order to get your vehicles placed, because of the possible necessity of rehandling other exhibits which have been set up.

"Buses or trucks arriving in Cleveland under their own power, can be delivered by owners' drivers direct to exhibition space and placed. Buses arriving by freight, where necessary to unload from cars, will be handled by Norris Bros. Company (official draymen), at the same rate as prevails for exhibit materials."

Companies driving buses over the road and wishing to have them washed, can instruct drivers to take them direct to the Auditorium Building Operating Company, East Sixth Street and St. Clair Avenue, Cleveland, Ohio. The schedule of rates including exterior wash, chamois body polish, and interior sweeping and dusting is single-deck buses, $3; double-deck buses, $4. Any single-deck bus that must be stored until the exhibitor has an opportunity of placing it in his exhibition space, will be charged for by the Auditorium Building Operating Company at a flat rate of $2 per night, or for 24 hours for such storage. The storage charge for double-deck buses would be $1 per night or for 24 hours. However, the double-deck buses would not be stored in inside space but would be outside of the building and under responsible watchman service.

Exhibitors are requested to hang from each steering wheel a tag showing the space number where the vehicle is to be placed. This will save moving around. They are also requested to advise Norris Brothers Company, 2138 Davenport Avenue, Cleveland, Ohio, whether the bus or truck will arrive by rail or under its own power, also as to the exact date it will arrive in Cleveland, so the company may plan its other trucking accordingly.

Attention is once again called to the clause in the space contract reading: "The tanks of all motor vehicles must be drained and all vehicles made inoperative immediately after being placed in exhibition space." Drip pans or oil proof canvas should be provided by the exhibitor for the protection of floors. No change of tires will be permitted between 12 noon, Oct. 1, and 12 noon Oct. 7.

Double Trackings In Detroit To Begin in Thirty Days

A mile of double track, estimated at $140,000, will be laid on the Fourteenth Avenue and Trumbull Avenue car lines within 60 days, according to an announcement by Del A. Smith, general manager of the Department of Street Railways in Detroit. The work will begin within 30 days and is to be completed on Oct. 15.

Extensions will involve 1 mile of double track on Livernois Avenue from Davison to Fenkell Avenues, linking the present terminus of the Fourteenth Avenue line at Davison and Livernois Avenues with the present Trumbull Avenue line between Fenkell and Six Mile Road on Livernois Avenue. The Trumbull Avenue line will be extended 1 mile west from Livernois on Fenkell Avenue to Wyoming Avenue.

Work on Boston Subway Extension Continues

Work is about to start on the fourth section of the Dorchester rapid transit system in Boston, a $10,000,000 project which was begun three years ago. There were eight bids for the work, ranging from $401,565 to $537,475, the lowest bid being from the C. & R. Construction Company, which also received the contract for the third section, now almost completed. The fourth section runs from Peabody Square to Shawmut Junction, and includes the Ashmont station. It will take about 300 days for its construction.

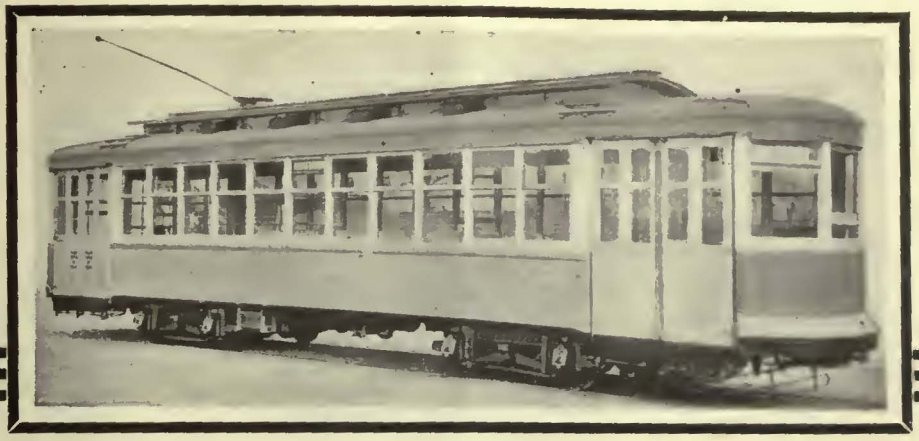
New Season Opens for Metal Sellers

Not much activity was expected in the non-ferrous metal market in the week ending Sept. 6, what with the Labor Day holiday and all, so potential sellers were not particularly disappointed at the disinterestedness of consumers.

Copper prices are again practically unchanged after another week, with only a small volume of trading. Most producers continue to offer the metal at 13¼ cents delivered in the East and 13⅜ cents in the Middle West, with only an occasional sale of a small lot. On the other hand, custom smelters are sellers at as low as 13⅛ cents, and manage to get rid of enough to prevent their cutting prices further. The foreign market also continues quiet, with the c.i.f. price unchanged at 13½ cents.

The lead market continues to decline and consumers have displayed little or no interest. One large seller is almost out of the market, but, nothwithstanding this, prices declined perceptibly. On Sept. 6 the American Smelting & Refining Company reduced its contract price from 6.50 cents to 6.40 cents New York.

Tin has remained steady, but there has been little or no demand by consumers, sales being mainly to dealers.



Another Canadian Railway Specifies
"Peacock" Staffless Brakes . . .

Reg. U. S. Pat. Off.

TWENTY one-man, two-man city type units, just placed in service by the Ottawa Electric Railway, Ottawa, Ont., and built by the Ottawa Car Manufacturing Co., are equipped with "Peacock" Staffless Brakes.

The cars have a seating capacity of 47 passengers, are 45 ft. long and are the last word in modern car construction.

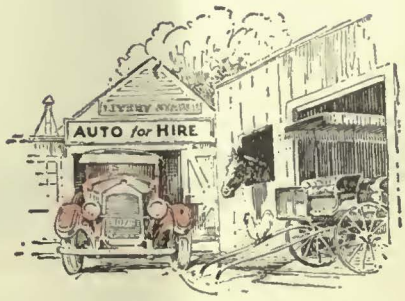
Let us tell you why this company and nearly all the purchasers of modern cars in the United States and Canada specify "Peacock" Staffless Brakes. A note on your letterhead will bring this interesting story.

National Brake Company, Inc.

890 Ellicott Square Buffalo, N. Y.

Canadian Representative

Lyman Tube & Supply Co., Ltd., Montreal, Can.



Reviving a Business with INDUSTRIAL ADVERTISING

HOW OFTEN have the major markets of some great business disappeared without notice, because of fashion's change, a revolutionary scientific discovery or some strong, uncombatable force.

What is a great business to do? Retire with honor? Or revive with glory? Here is the story of one manufacturer who chose the latter course.

Life in the Balance

The Armistice, shortly followed by the "5-5-3 agreement" on naval limitations, cut this manufacturer's market to a critical fraction of his plant capacity. His corporate life hung in the balance. With the vanishing of the old market, this producer resourcefully turned to a comparatively new, and at that time little used secondary product.

A research bureau was established to determine the adaptability of the new product to different industries. As sales opportunities unfolded, salesmen were trained as specialists in the specific fields. The selling was pitched on the high plane of genuine service to the buyer. There was no promiscuous selling—no knocking at doors in hope that prospects would be found within.

Industrial Advertising, conceived to build industrial recognition for this new product and its salesmen, was planned and scheduled with the same shrewd regard for specialization. The counsel of an experienced advertising agent was obtained. The Industrial Advertising, geared to the self-interests of the different classes of industrial buyers, was persistently published in McGraw-Hill Publications.

A Sensational Recovery

Aided by the power and force of Industrial Advertising, this producer "cheated the mourners" by developing a volume for the new product far in excess of the highest peak of any previous prosperity. And this achievement took place while the general business trend in collateral industries was in a declining direction.

If Industrial Advertising, co-ordinated with an Industrial Marketing plan, can rehabilitate a declining business, who can estimate its power and force when aided by favorable circumstances?

This sensational recovery was not the result of some miraculous chance. It was the outcome of just such common-sense marketing methods as are formulated in the McGraw-Hill book, "Industrial Marketing at Work." If you are an executive interested in the national industrial market, a McGraw-Hill representative will leave a copy of this book with you or your advertising agent. Notify the nearest McGraw-Hill office.

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW—BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH

1 to 3 inches..... $4.50 an inch
4 to 7 inches..... 4 3a an inch
8 to 14 inches..... 4 1a an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page

POSITIONS WANTED

EQUIPMENT superintendent, experienced and efficient in the maintenance of cars and busses, good organizer, assuring reliable equipment with low cost. Age 45. References past and present employers, correspondence solicited. PW-35, Electric Railway Journal, 7 South Dearborn St., Chicago, Ill.

SUPERINTENDENT transportation. 20 years' experience city and interurban properties; also co-ordination rail and bus. Recognized ability, highly commended record of achievements. Successful dealing with labor, public. Increasing revenue. Decreasing operating costs. Fully capable of getting results. Fine references. PW-34, Electric Railway Journal, Guardian Bldg., Cleveland, O.

WOULD like to correspond with any company needing a high-grade official in any capacity, in city or interurban railways. Can manage any or all departments in the most efficient manner. PW-33, Electric Railway Journal, Guardian Bldg., Cleveland, O.

YOUNG man desires position in power saving department of electric railway. Four years' experience with economy meters including preliminary work organization, clerical statistical maintenance and motormen instruction work. Good references. PW-37, Electric Railway Journal, 7 South Dearborn Street, Chicago, Ill.

Railway Substation Equipment

600 Volts D. C., 3 Phase, 25 Cycle, 33,000 volts A. C.

10—300 kw. Westinghouse Rotary Converters, 600 volts D.C., 500 amps. D.C., 500 r.p.m.; 3 phase, 25 cycle, 390 volts A.C. with Westinghouse Type C Induction Motors for starting, 3 phase, 25 cycle, 390 volts. Each complete with:

3—100 kva. Westinghouse single phase, oil cooled Transformers, 25 cycle, 33,000 volts primary, 300 volts secondary.

Elaborate marble alternating current starting and control panels, high tension disconnect switches, lightning arresters, choke coils, etc., also marble direct current control and feeder panels with instruments, circuit breakers, switches, etc.

All on original foundation in first-class operative condition and complete as in operation.

Write or wire for details and prices.

The National Power Machinery Company

1927 Scranton Road, Cleveland, Ohio

"Opportunity" Advertising:

Think
"SEARCHLIGHT"
First!

FOR SALE

JOHNSON FARE BOXES

47—D-M-2, good operating condition; low price. Changed method of collection, reason for selling.

GRAND RAPIDS RAILROAD CO.
42 Ionia Ave., Grand Rapids, Mich.

FOR SALE

15 BIRNEY SAFETY CARS

Brill Built
West, 508 or G. E. 264 Motors
Cars Complete—Low Price—Fine Condition
ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

FOR SALE

TANDEM ROLLER

1—Springfield-Buffalo 5-ton, for $2,000. Cost $3,100 new. Has had very little use and is in first-class condition.

Trenton & Mercer Co. Traction Corp.
Broad St. Bank Bldg., 143-149 E. State St., Trenton, N. J.

If there is anything you want—

or something you don't want that *other* readers of this paper can supply—or use—advertise in the

SEARCHLIGHT SECTION

Somebody is always looking for something to meet certain business needs. Some men in charge of plant operations may be in the market for good used equipment—others may have just what they want, to sell. Some may require a man of unusual qualifications for a particular position—that man may be another reader of this paper!

Put the Searchlight Section to work for you under any of the following classifications—to fill your business needs.

Agencies Wanted
Agents Wanted
Auction Notices
Buildings For Sale
Business Opportunities
Civil Service Opportunities
Contracts To Be Let
Contracts Wanted
Educational Courses
Employment Agencies
Exchanges
For Rent Items
Franchises
Industrial Sites
Miscellaneous Wants
New Industries Wanted
Partners Wanted
Patents For Sale
Patent Attorneys
Plants For Sale
Positions Vacant
Positions Wanted
Property For Sale
Receivers' Sales
Representatives Wanted
Salesmen Wanted
Work Wanted
Etc., Etc., Etc.

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.
Air Brakes
Westinghouse Air Brake Co.
Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Armature Shop Tools
Columbia Machine Works
Elec. Service Supplies Co.
Automatic Return Switch Stands
Ramapo Ajax Corp.
Automatic Safety Switch Stands
Ramapo Ajax Corp.
Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Cincinnati Car Co.
Illinois Steel Co.
St. Louis Car Co.
Standard Steel Works
Westinghouse E. & M. Co.
Babbitt Metal
National Bearing Metals Corp (More Jones Brass & Metal Co. Div.)
Babbitting Devices
Columbia Machine Works & M. I. Co.
Barges, Steel
American Bridge Co.
Badges and Buttons
Elec. Service Supplies Co.
International Register Co.
Batteries, Dry
Nichols-Lintern Co.
Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
National Bearing Metals Corp.
(More-Jones Brass & Metal Co. (Div.)
St. Louis Car Co.
Westinghouse E. & M. Co.
Bearings, Center and Roller Side
Cincinnati Car Co.
Columbia Machine Works
Stucki Co., A.
Bells and Buzzers
Consolidated Car Heating Co.
Bells and Gongs
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
St. Louis Car Co.
Benders, Rail
Railway Trackwork Co.
Bodies, Bus
Brill Co., The J. G
St. Louis Car Co.
Body Material, Haskelite and Plymetl
Haskelite Mfg. Corp.
Boilers
Babcock & Wilcox Co.
Bolts & Nuts, Track
Illinois Steel Co.

Bond Testers
American Steel & Wire Co.
Electric Service Supplies Co.
Bonding Apparatus
American Steel & Wire Co.
Elec. Service Supplies Co
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co
Bonds, Rail
American Steel & Wire Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.
Brackets and Cross Arms (See also Poles, Ties, Posts, etc.)
American Bridge Co.
Bates Expanded Steel Truss Co.
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.
Brake Adjusters
Brill Co., The J. G
Cincinnati Car Co.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.
Brake Shoes
American Brake Shoe & Foundry Co.
Bemis Car Truck Co.
Brill Co., The J. G.
St. Louis Car Co.
Brake Testers
National Ry. Appliance Co.
Brakes, Brake Systems and Brake Parts
Bemis Car Truck Co
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
St. Louis Car Co.
Westinghouse Tr. Br. Co.
Brakes, Magnetic Rail
Cincinnati Car Co.
Bridges, Steel
American Bridge Co.
Brushes, Carbon
General Electric Co.
Jeandron, W. J.
LeCarbone Co.
Morganite Brush Co.
Westinghouse E. & M. Co.
Brushes, Graphite
Morganite Brush Co.
Brushholders
Columbia Machine Works
Buildings, Steel
American Bridge Co.
Bulkheads
Haskelite Mfg. Corp.
Bunkers, Coal
American Bridge Co.
Bus Lighting
National Ry. Appliance Co.
Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
Columbia Machine Works
St. Louis Car Co.
Cables (See Wires and Cables)
Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.
Carbon Brushes (See Brushes, Carbon)
Car Lighting Fixtures
Elec. Service Supplies Co.
Car Panel Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.
Car Steps, Safety
Cincinnati Car Co.
Car Wheels, Rolled Steel
Bethlehem Steel Co.
Cars, Dump
Brill Co., The J. G.
Differential Steel Car Co.
St. Louis Car Co.
Cars, Gas-Electric
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.
Cars, Gas, Rail
Brill Co., The J. G.
St. Louis Car Co.
Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cincinnati Car Co.
Kuhlman Car Co., G. C.
St. Louis Car Co.
Wason Mfg. Co.
Cars, Second Hand
Electric Equipment Co.
Cars, Self-Propelled
Brill Co., The J. G.
General Electric Co.
Castings, Brass Composition or Copper
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
National Bearing Metals Corp.
(More-Jones Brass & Metal Co. (Div.)
Castings, Gray Iron and Steel
American Bridge Co.
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Standard Steel Works
Castings, Malleable & Brass
Bemis Car Truck Co.
Columbia Machine Works & M. I. Co.
St. Louis Car Co.
Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Wood Co., Chas N.
Catenary Construction
Archbold-Brady Co.
Ceiling Car
Haskelite Mfg. Corp.
Ceilings, Plywood, Panels
Haskelite Mfg. Corp.
Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.
Change Trays
Cincinnati Car Co.
Circuit-Breakers
General Electric Co.
Westinghouse E. & M. Co.
Clamps and Connectors for Wires and Cables
Columbia Machine Works
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Westinghouse E. & M. Co.
Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Cincinnati Car Co.
Ohio Brass Co.
St. Louis Car Co.
Clusters and Sockets
General Electric Co
Coil Banding and Winding Machines
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Westinghouse E. & M. Co.
Coils, Armature and Field
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.
Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Coin Changers
Johnson Fare Box Co.
Coin Counting Machines
Cleveland Fare Box Co.
International Register Co.
Johnson Fare Box Co.
Coin Sorting Machines
Cleveland Fare Box Co.
Johnson Fare Box Co.
Coin Wrappers
Cleveland Fare Box Co.
Commutator Slotters
Columbia Machine Works
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.
Wood Co., Chas. N.
Commutator Truing Devices
General Electric Co.
Commutators or Parts
Cameron Electrical Mfg. Co.
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.
Compressors, Air
General Electric Co.
Westinghouse Tr. Br. Co.
Condensers
General Electric Co.
Westinghouse E. & M. Co.
Condensor Papers
Irvington Varnish & Ins. Co.
Connectors, Solderless
Westinghouse E. & M. Co.
Connectors, Trailer Car
Columbia Machine Works
Consolidated Car Heating Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Controllers or Parts
Columbia Machine Works & M. I. Co.
General Electric Co.
Westinghouse E. & M. Co.
Controller Regulators
Elec. Service Supplies Co.
Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.
Converters, Rotary
General Electric Co.
Westinghouse E. & M. Co.
Conveying & Hoisting Machinery
American Bridge Co.
Copper Wire
American Brass Co
American Steel & Wire Co.
Anaconda Copper Mining Co
Copper Wire Instruments, Measuring, Testing and Recording
American Brass Co.
Anaconda Copper Mining Co.
Cord, Bell, Trolley, Register
American Steel & Wire Co.
Brill Co., The J. G.
Elec. Service Supplies Co.
International Register Co.
Roebling's Sons Co., John A.
St. Louis Car Co.
Samson Cordage Works
Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.
Couplers, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Ohio Brass Co.
Westinghouse Traction Brake Co.
Cowl Ventilators
Nichols-Lintern Co.
Cranes, Hoists & Lifts
Electric Service Supplies Co.
Cross Arms (See Brackets)
Crossing Foundations
International Steel Tie Co.
Crossings
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Crossings, Frogs & Switches
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Crossings, Manganese
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Crossings, Track (See Track Special Work)
Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.
Curtains & Curtain Fixtures
Brill Co., The J. G.
St. Louis Car Co.
Dealer's Machinery & Second Hand Equipment
Electric Equipment Co.
Grand Rapids R.R. Co.
National Power & Mchy. Co.
Trenton & Mercer Co. Traction Corp.
Derailing Devices (See also Track Work)
Derailing Switches
Ramapo Ajax Corp.
Destination Signs
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Detective Service
Wish-Service, P. Edward
Door Operating Devices
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
National Pneumatic Co.
Safety Car Devices Co.
Doors & Door Fixtures
Brill Co., The J. G.
Cincinnati Car Co.
General Electric Co.
Hale-Kilburn Co.
St. Louis Car Co.
Doors, Folding Vestibule
National Pneumatic Co.
Safety Car Devices Co.
Drills, Track
American Steel & Wire Co.
Electric Service Supplies Co.
Ohio Brass Co.
Dryers, Sand
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Ears
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Electric Grinders
Railway Trackwork Co.
Electric Transmission Towers
American Bridge Co.
Electrical Wires and Cables
Amer. Electrical Works.
American Steel & Wire Co
John A. Roebling's Sons Co
Electrodes, Carbon
Railway Trackwork Co.
Una Welding & Bonding Co
Electrodes, Steel
Railway Trackwork Co.
Una Welding & Bonding Co
Engineers, Consulting, Contracting and Operating
Archbold-Brady Co.
Beeler, John A.
Bibbins, J. Rowland
Byllesby Co., H. M.
Day & Zimmermann, Inc
Falle & Co., E. H.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
Lion & Marshall Co.
McClellan & Junkersfeld
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster Co.
White Eng. Corp., The J. G
Engines, Gas, Oil or Steam
Westinghouse E. & M. Co
Exterior Side Panels
Haskelite Mfg. Corp.
Fare Boxes
Cleveland Fare Box Co.
Johnson Fare Box Co.
Perey Mfg. Co.
Fare Registers
Electric Service Supplies Co
Johnson Fare Box Co.
Fences, Woven Wire & Fence Posts
American Steel & Wire Co
Fenders and Wheel Guards
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Fender Co
St. Louis Car Co.
Star Brass Works
Wood Co., Chas. N.
Fibre and Fibre Tubing
Westinghouse E. & M. Co.
Field Coils (See Coils)
Floodlights
Electric Service Supplies Co
Floor, Sub
Haskelite Mfg. Corp.
Floors
Haskelite Mfg. Corp.
Forgings
Brill Co., The J. G.
Cincinnati Car Co.
Standard Steel Works
Frogs & Crossings, Tee Rail
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Frogs, Track (See Track Work)
Frogs, Trolley
Electric Service Supplies Co
Ohio Brass Co.
Westinghouse E. & M. Co
Furnaces Electric, Steel Melting
American Bridge Co.
Fuses and Fuse Boxes
Columbia Machine Works & M. I. Co.
Consolidated Car Heating Co
General Electric Co.
Westinghouse E. & M. Co.
Fuses, Refillable
General Electric Co.
Gaskets
Westinghouse Tr. Br. Co.
Gas Producers
Westinghouse E. & M. Co
Gates, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Gear Blanks
Brill Co., The J. G.
Standard Steel Works
Gear Cases
Chillingworth Mfg. Co.
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co
Westinghouse E. & M. Co.
Gears and Pinions
Bemis Car Truck Co
Columbia Machine Works & M. I. Co.
Electric Service Supplies Co
General Electric Co.
Nat'l Ry. Appliance Co.
Generating Sets, Gas-Electric
General Electric Co.
Generators
General Electric Co.
Westinghouse E. & M. Co
Girder Rails
Bethlehem Steel Co.
Lorain Steel Co.
Gongs (See Bells and Gongs)
Greases (See Lubricants)
Grinders, Portable
Railway Trackwork Co.
Grinders, Portable Electric
Railway Trackwork Co.
Grinding Bricks and Wheels
Railway Trackwork Co.
Guard Rail Clamps
Ramapo Ajax Corp.
Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.
Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.
Harps, Trolley
Columbia Machine Works
Elec. Service Supplies Co.
National Bearing Metals Corp.
(More-Jones Brass & Metal Co. (Div.)
Star Brass Works

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Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Headlining
Columbia Machine Works & M. I. Co.
Haskelite Mfg. Corp.

Heaters, Bus
Nichols-Lintern Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Heaters, Car Stove
Smith Heater Co., Peter

Helmets, Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Hoists & Lifts
Columbia Machine Works & M. I. Co.

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic
Westinghouse Traction Brake Co.

Instruments, Measuring, Testing and Recording
American Steel & Wire Co.
General Electric Co.
National Ry. Appliance Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
U. S. Rubber Co.
Westinghouse E. & M. Co.

Insulating Silk
Irvington Varnish & Ins. Co.

Insulating Varnishes
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
U. S. Rubber Co.
Westinghouse E. & M. Co.

Insulation Slots
Irvington Varnish & Ins. Co

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Interior Side Linings
Haskelite Mfg. Corp.

Interurban Cars (See Cars)

Jacks (See also Cranes, Hoists and Lifts)
Buda Company
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.

Joints, Rail
(See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Lamp Guards and Fixtures
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Arc & Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Elec. Service Supplies Co.
Nichols-Lintern Co.

Lanterns, Classification
Nichols-Lintern Co.

Letter Boards
Cincinnati Car Co.
Haskelite Mfg. Corp.

Lighting Fixtures, Interior
Electric Service Supplies Co.

Lightning Protection
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
National Bearing Metals Corp.
(More-Jones Brass & Metal Co. (Div.)
Ohio Brass Co.
Westinghouse E. & M. Co.

Locking Spring Boxes
Wm. Wharton, Jr. & Co.

Locomotives, Electric
Cincinnati Car Co.
General Electric Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Lubricating Engineers
Universal Lubricating Co.

Lubricants, Oil and Grease
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Guard Rails
Ramapo Ajax Corp.
Wm. Wharton Jr. & Co.

Manganese Steel, Special Track Work
Bethlehem Steel Co.
Wm. Wharton, Jr. & Co.

Manganese Steel Switches, Frogs and Crossings
Bethlehem Steel Co.
Ramapo Ajax Corp.
Wm. Wharton, Jr. & Co.

Meters (See Instruments)

Mirrors, Inside & Outside
Cincinnati Car Co.

Motor and Generator Sets
General Electric Co.

Motor Buses (See Buses)

Motor Trucks
International Harvester Co.

Motors, Electric
General Electric Co.
Westinghouse E. & M. Co.

Motorman's Seats
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
St. Louis Car Co.
Wood Co., Chas. N.

Nuts and Bolts
Bemis Car Truck Co.
Cincinnati Car Co.
Hubbard & Co.

Oils (See Lubricants)

Omnibuses (See Buses)

Oxygen
International Oxygen Co.

Packing
U. S. Rubber Co.
Westinghouse Traction Brake Co.

Paints and Varnishes (Insulating)
Elec. Service Supplies Co.
Irvington Varnish & Ins. Co.

Paints & Varnishes, Railway
Dixon Crucible Co., Joseph
National Ry. Appliance Co.

Panels, Outside, Inside
Haskelite Mfg. Corp.

Pickup, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Ohio Brass Co.
Westinghouse Traction Brake Co.

Pipe Fittings
Standard Steel Works
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Supplies Co.

Plywood, Roofs, Headlinings, Floors, Interior Panels, Bulkheads, Truss Planks
Haskelite Mfg. Corp.

Pole Line Hardware
Bethlehem Steel Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
Hubbard & Co.

Poles and Ties Treated
International Creosoting & Construction Co.

Poles, Ties, Posts, Piling & Lumber
International Creosoting & Construction Co.
Naugle Pole & Tie Co.

Poles, Trolley
Elec. Service Supplies Co.

Poles, Tubular Steel
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.

Portable Grinders
Buda Company
Railway Trackwork Co.

Potheads
Okonite Co.
Okonite-Callender Cable Co., Inc.

Power Houses
American Bridge Co.

Power Saving Devices
National Ry. Appliance Co.

Pressings, Special Steel
Cincinnati Car Co.

Pressure Regulators
General Electric Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Punches, Ticket
International Register Co.
Wood Co., Chas. N.

Rail Braces and Fastenings
Ramapo Ajax Corp.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.
Illinois Steel Co.

Rail Joints, Welded
Lorain Steel Co.

Rail Welding
Railway Trackwork Co.
Una Welding & Bonding Co.

Rails, Steel
Carnegie Steel Co.
Illinois Steel Co.

Railway Safety Switches
Consolidated Car Heating Co.
Westinghouse E. & M. Co.

Rattan
Brill Co., The J. G.
Elec. Service Supplies Co.
Hale-Kilburn Co.
St. Louis Car Co.

Registers and Fittings
Brill Co., The J. G.
Cincinnati Car Co.
Elec. Service Supplies Co.
International Register Co.
St. Louis Car Co.

Reinforcement, Conrete
American Steel & Wire Co.
Bethlehem Steel Co.
Carnegie Steel Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
General Electric Co.
Westinghouse E. & M. Co.

Replacers, Car
Cincinnati Car Co.
Elec. Service Supplies Co.

Resistances
Consolidated Car Heating Co.

Resistance, Wire and Tube
General Electric Co.
Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers Trolley)

Rheostats
General Electric Co.
Westinghouse E. & M. Co.

Roofing, Car
Haskelite Mfg. Corp.

Roofs, Car and Bus
Haskelite Mfg. Corp.

Rubber Specialties of All Kinds
U. S. Rubber Co.

Safety Control Devices
Safety Car Devices Co.

Sanders, Track
Brill Co., The J. G.
Elec. Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.
St. Louis Car Co.

Sash Fixtures, Car
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Sash, Metal Car Window
Hale-Kilburn Co.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Elec. Service Supplies Co.

Seating Materials
Brill Co., The J. G.
Haskelite Mfg. Corp.
St. Louis Car Co.

Seats, Bus
Brill Co., The J. G.
Hale-Kilburn Co.
St. Louis Car Co.

Seats, Car (See also Rattan)
Brill Co., The J. G.
Cincinnati Car Co.
Hale-Kilburn Co.
St. Louis Car Co.

Second Hand Equipment
Electric Equipment Co.
Grand Rapids R. R. Co.
National Power & Mchy. Co.
Trenton & Mercer Co. Traction Corp.

Shades, Vestibule
Brill Co., The J. G.
Cincinnati Car Co.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Shovels, Power
Brill Co., The J. G.

Side Bearings (See Bearings Center and Side)

Signals, Car Starting
Consolidated Car Heating Co.
Elec. Service Supplies Co.
National Pneumatic Co.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Block
Elec. Service Supplies Co.
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Highway Crossing
Nachod and United States Electric Signal Co.
Wood Co., Chas. N.

Slack Adjusters (See Brake Adjusters)

Sleet Wheels and Cutters
Cincinnati Car Co.
Columbia Machine Works & M. I. Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
National Bearing Metals Corp.
(More-Jones Brass & Metal Co. (Div.)

Smokestacks, Car
Nichols-Lintern Co.

Snow Plows
National Ry. Appliance Co.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Columbia Machine Works & M. I. Co.
Consolidated Car Fender Co.
St. Louis Car Co.

Snow Sweeper, Rattan
J. G. Brill Co.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Bethlehem Steel Co.
Lorain Steel Co.
Wm. Wharton, Jr. & Co.

Spikes
American Steel & Wire Co.
Illinois Steel Co.

Splicing Compounds
U. S. Rubber Co.
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs
National Ry. Appliance Co.

Springs, Car and Truck
American Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.
Standard Steel Works

Sprinklers, Track and Road
Brill Co., The J. G.
St. Louis Car Co.

Steel and Steel Products
American Steel & Wire Co.
Carnegie Steel Co.
Illinois Steel Co.

Steps, Car
Brill Co., The J. G.
Cincinnati Car Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain Insulators
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Street Cars (See Cars, Passenger, Freight, Express)

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switch Stands and Fixtures
Ramapo-Ajax Corp.

Switches, Selector
Nichols-Lintern Co.

Switches and Switchboards
Consolidated Car Heating Co.
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Switches, Tee Rail
Ramapo-Ajax Corp.

Switches, Track (See Track Special Work

Tampers, Tie
Railway Trackwork Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Ramapo-Ajax Corp.

Telephones and Parts
Elec. Service Supplies Co.

Telephone & Telegraph Wire
American Steel & Wire Co.

Testing Instruments (See Instruments, Measuring, Testing, etc.)

Thermostats
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers and Destroyers
Elec. Service Supplies Co

Tie Plates
Illinois Steel Co.

Ties and Tie Rods, Steel
American Bridge Co.
Carnegie Steel Co.
International Steel Tie Co

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tires
U. S. Rubber Co.

Tokens
Johnson Fare Box Co.

Tongue Switches
Wm. Wharton, Jr. & Co.

Tools, Track & Miscellaneous
American Steel & Wire Co.
Columbia Machine Works & M. I. Co.
Elec. Service Supplies Co.
Hubbard & Co.
Railway Trackwork Co.
Ramapo-Ajax Corp.

Towers and Transmission Structure
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Westinghouse E. & M. Co.

Track Grinders
Railway Trackwork Co.
Ramapo-Ajax Corp.

Track, Special Work
Buda Company
Columbia Machine Works & M. I. Co.
Ramapo Ajax Corp.

Trackless Trolley Cars
Brill Co., The J. G.
St. Louis Car Co.

Transfer Tables
American Bridge Co.

Transformers
General Electric Co.
Westinghouse E. & M. Co.

Transmission Towers & ... Structures
American Bridge Co.

Treads, Safety Stair, Car Step
Cincinnati Car Co.

Tree Wire
Okonite Co.
Okonite-Callender Cable Co.

Trolley Bases
General Electric Co.
National Bearing Metals Corp.
(More-Jones Brass & Metal Co. (Div.)
Ohio Brass Co.

Trolley Bases, Retrieving
General Electric Co.
Ohio Brass Co.

Trolley Buses
Brill Co., The J. G.
General Electric Co.
Westinghouse E. & M. Co.

Trolley Material, Overhead
Elec. Service Supplies Co.
National Bearing Metals Corp.
(More-Jones Brass & Metal Co. (Div.)
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Wheel Bushings
National Bearing Metals Corp.
(More-Jones Brass & Metal Co. (Div.)
Star Brass Works

Trolley Wheels (See Wheels Trolley)

Trolley Wire
Amer. Electrical Works
American Brass Co.
American Steel & Wire Co.
Anaconda Copper Min. Co
Roebling's Sons Co., J. A.

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
Cincinnati Car Co.
St. Louis Car Co.

Truss Planks
Haskelite Mfg. Corp.

Tubing, Yellow and Black Flexible Varnish
Irvington Varnish & Ins.

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ALPHABETICAL INDEX TO ADVERTISEMENTS

WHAT AND WHERE TO BUY—Continued from page 30

Turbines, Steam
General Electric Co.
Westinghouse E. & M. Co.

Turntables
American Bridge Co.
Elec. Service Supplies Co.

Turnstiles
Elec. Service Supplies Co.
Perey Mfg. Co., Inc.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co

Varnished Papers and Silks
Irvington Varnish & Ins. Co.

Ventilators, Car
Brill Co., The J. G.
Cincinnati Car Co.
Consolidated Car Heating Co.
Nichols-Lintern Co.

Vestibule Linings
Haskelite Mfg. Corp.

Welded Rail Joints
Railway Trackwork Co.
Una Welding & Bonding Co.

Welders, Portable Electric
Ohio Brass Co.
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Welders, Rail Joint
Ohio Brass Co.
Railway Trackwork Co.

Welding Processes and Apparatus
General Electric Co.
Ohio Brass Co.
Nat'l. Ry. Appliance Co.
Railway Utility Co.
St. Louis Car Co.

Welding Steel
Railway Trackwork Co.
Una Welding & Bonding Co.

Welding Wire
American Steel & Wire Co.
General Electric Co.
Railway Trackwork Co.
Roebling's Sons Co., J. A.

Welding Wire and Rods
Railway Trackwork Co.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Cast Iron
Griffin Wheel
Railway Trackwork Co.
Una Welding & Bonding Co.
Westinghouse E. & M. Co.

Wheels, Car, Steel & Steel Tire
Bemis Car Truck Co.
Carnegie Steel Co.
Illinois Steel Co.
Standard Steel Works

Wheels, Trolley
Columbia Machine Works & M. I. Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
National Bearing Metals Corp.
(More-Jones Brass & Metal Co. (Div.)
Star Brass Works

Wheels, Wrought Steel
Carnegie Steel Co.
Illinois Steel Co.

Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.
Westinghouse Traction Brake Co.

Window Guards & Fittings
Cincinnati Car Co.

Wire Rope
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Wires and Cables
American Brass Co.
American Electrical Works
American Steel & Wire Co.
Anaconda Copper Min. Co.
General Electric Co.
Okonite Co.
Okonite-Callender Cable Co Inc.
Roebling's Sons Co., J. A
Westinghouse E & M. Co.

Riding Comfort—a contribution of Brill Truck Design

Brill Graduated Spring System—

Assures equally good riding with varying passenger loads.

With a quick-acting coil spring (3) on top of a slower-acting semi-elliptic spring (4) under each end of the truck bolster, the former furnishes the necessary spring action when the car body is empty or has a light load. When the load has increased to a point that the coil spring cap (1) formed on the bolster end contacts with the coil spring seat (2) the coil spring automatically goes out of action, and from that point on the necessary spring action is furnished by the heavier plate spring. Thus, equally good riding is obtained with both light and heavy loads.

"Recommended by Proven Merit"

The Brill 177-E Truck, particularly designed for light-weight modern cars, includes a number of patented features which contribute much to its smooth and comfortable riding action. As riding comfort is an outstanding factor in attracting revenue passengers, the type of truck is of the utmost importance. Brill engineers have developed such patent features as the Bolster Guide, Graduated Spring System and Twin Links in their effort to obtain maximum truck efficiency, and the results achieved in improved riding comfort are a contribution to the success of modern electric cars.

Brill 177-E Truck

Described in Bulletin No. 306

THE J. G. BRILL COMPANY
PHILADELPHIA, PA.
AMERICAN CAR CO. ST. LOUIS MO. — G. C. KUHLMAN CAR CO. CLEVELAND, OHIO. — WASON MANF'G CO. SPRINGFIELD, MASS.

Newly purchased 80-ton, G-E Locomotive, swivel-truck type, equipped with four GE-69 Motors and Type M control.

In service 25 years—
still doing a full day's work

Early in 1901 two 50-ton G-E Electric Locomotives started to work for the St. Louis & Belleville Electric Railway Company.

The service has been exceptionally severe, yet these locomotives, with their original GE-55 Motors and Type L3 controllers, still make their daily run. Repairs have been slight—a new CP-30 Compressor, new trolley bases, and lightning arresters. And of special significance is the fact that maintenance costs for each locomotive have averaged only $1180.00 per year for the past 16 years.

Rapidly increasing traffic made another locomotive necessary. Naturally it was purchased from General Electric because of the trouble-free service its predecessors had given.

In spite of the long period of service, these two G-E Locomotives will continue in operation assisted by the new 80-ton locomotive recently delivered. Records such as this have earned for G-E locomotives their reputation for dependability.

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GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, N. Y., SALES OFFICES IN PRINCIPAL CITIES