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JAMES H. MCGRAW, President.

HUGH M. WILSON, 1st Vice-President. A. E. CLIFFORD, 2d Vice-President.

CURTIS E. WHITTLESEY, Secretary and Treasurer.

TELEPHONE CALL: 4700 BRYANT. CABLE ADDRESS: STRYJOURN, NEW YORK.

HENRY W. BLAKE, Editor.

L. E. GOULD, Western Editor.

Associate Editors:

RODNEY HITT, FRIDERIC NICHOLAS, WALTER JACKSON.

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CHICAGO OFFICE.....1570 Old Colony Building  
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## Transfer Changes in Brooklyn

Until recent changes were made it was a matter of common public knowledge that many passengers on the lines of the Brooklyn Rapid Transit System could travel by the judicious or daring juggling of transfers from starting point to destination and return for a single fare. This condition, although contrary to the spirit of right, developed so that it became a menace to the company. A modification of rules was announced, to take effect on Oct. 15, the general result of which was to require transfer passengers to travel in one general direction. A prompt complaint regarding the new system was made to the Public Service Commission for the First District and that body has begun a series of hearings which, it is to be hoped, will develop, for the benefit of the clear understanding of the fair-minded, the meaning of the company when it explains that the governing reason for the change is the prevalent abuse of the transfer system. Chairman Stevens, of the Public Service Commission for the Second District, who is a careful and able student of electric railway conditions, told an audience in Detroit early in the present year that "the great problem with traction companies in New York is the abuse of the transfer system." The Brooklyn Rapid Transit Company now has a unique opportunity to demonstrate the truth of this statement in a way that will convince the public that transfer use is legitimate, but transfer abuse is illegitimate. The Public Service Commission is charged with a duty to consider the complaint upon which the present proceedings are based, but a prior duty rests with the company to make a strong presentation of the facts which support its position.

## The Last Act of the Strike

It is plain to all that the strike of conductors and motormen of the Columbus Railway & Light Company, now ended, was unfortunate for the employees, the company and the general public. It cost the employees their wages and loss of permanent places; it cost the company a large sum in depleted revenues and increased expenses; and what it cost the public in actual outlay of money by the State of Ohio and the city of Columbus, in loss of trade by merchants, and through the disturbance of transit facilities, is incalculable. If the strikers had won, they would have maintained the organization whose strained desire for masterful domination of the men and their relations with the company was the real issue in the strike. That is presumably all they would have gained, as no other issue was considered of importance. Having lost, the men have neither their organization nor, unfortunately, their places. Columbus is a city in which the relations between the railway and its employees, until the commencement of differences this year, were believed to be unusually agreeable. Into this situation organizers from another city injected their demoralizing influence. Without places of livelihood at stake, without the inter-

est of residents in the community, these men were in the main responsible for turning a peaceful city into chaos. For 12 weeks and three days, although on a diminishing scale, sympathizers promoted unrest and anarchy. Compared with the population of Columbus and with the customary throngs of visitors in the city the number of men who struck, and in whose ostensible behalf so much trouble has ensued, amounts to but a fraction; and as a serious indictment of the easy government of a large city this fact, that a few men could produce riots as serious as those which marked the early progress of the strike, is entitled to consideration. To the consistent attitude of the company in announcing a position at the start from which it never receded and in continuing to do its best to operate the cars, whether with or without the help of the public authorities, is due the final act of the strike, its formal end by resolution of the union representing the unfortunate men.

#### Seating Arrangement of Prepayment Cars

Many new and unusual problems have been encountered as the result of adopting the prepayment method of fare collection on cars. Successful operation of cars of this type during rush hours depends very largely on the speed of loading and unloading and to attain this end some cars have been built with excessively long platforms. The length of the platform, however, is not the only factor which affects the loading speed. If the passengers inside of the car cannot be induced to move forward and leave the entrance passageway clear the progress of the entering passengers is very slow. The object sought is to have the passengers continually move forward and leave by the front exit door, but convenience sometimes requires that they be allowed to leave by the rear exit also. The seating arrangement adjoining the rear platform has been found in at least one instance to have an important effect in forcing the passengers forward in the car and keeping the rear entrance reasonably clear. In the first cars of the prepayment type which were ordered by a city system longitudinal seats only were provided. The congestion of standing passengers near the entrance proved a serious objection, and it could not be overcome by the use of signs requesting the passengers to move forward and leave by the front door or by the conductor's vocal reiteration of this request. The second lot of cars ordered had cross seats in the center and longitudinal seats for four passengers in each corner. The congestion in the wide aisle between these end seats was as bad as in the longitudinal seat cars, but when the seats were shortened by half and another cross seat was put in on each side the small aisle space which remained was kept clear without difficulty. An entering passenger had only to force his way through four or five standing passengers in this restricted area instead of pushing against a compact mass of 15 or 20 persons. The narrow space acted as a funnel, to keep the standing load constantly moving toward the front end, and much less trouble with overcrowding has been experienced since this change was made. This solution of the problem was not the result of theorizing but of careful observations of the spirit and actions of the passengers who used the cars night and morning. It is quite probable that circulation in prepayment cars would be promoted in many cases by a more generous use of signs. All cars of this type are lettered on the outside, but many are not lettered on the inside. If large signs should be carried within the car they might often be of great assistance.

#### POWER STATION EXPENSES

One of the puzzling questions which sometimes arise in power station economics is the segregation of the respective expenses when both lighting and railway service is supplied from the same station, and even from the same generators. No matter whether the power thus furnished is sold separately or used by the same operating company, it is still desirable to form a definite idea of the cost of production, and the considerations involved are somewhat intricate. The simplest case, perhaps, is that in which the railway power is sold to an operating company. Here the vital problem is to make the sale yield a reasonable profit, to do which some plan for segregating the cost must be formulated. In cases where the railway power requires the addition of certain generators to be operated separately it is obvious that the operating and fixed charges against these can be figured much as if they were in a separate station. In effect they are, since extra boiler capacity is probably also installed, and if needful the steam supplied can be closely evaluated. Such an arrangement involves no interrelation between the loads on the two services, and simply can be dealt with by itself.

When, however, the whole service comes from the same set of busbars the trouble begins. On the one hand the introduction of railway load tends to help the general load factor by giving load all through the day, and on the other it may increase the difficulties of station regulation and produce a peak of an irregular and troublesome character. The daily curve of a railway load is a function of many things and varies greatly from place to place. It is quite safe to say, however, that it does not produce a peak proportionate to the total increase of output. In other words, a well-handled railway load gives a considerably better load factor than a normal lighting load. Hence, owing to the diversity of the demand, the station that carries the combined load will very generally have an improved load factor and be able to produce the total power more cheaply than before. How shall this factor in the expense account be allowed for, if at all? If the expenses are divided in direct proportion to the output used for each purpose, the lighting output receives unearned benefit from the improvement in load factor. If there were any simple relation between load factor and cost, this error could readily be corrected, but there is no such simple and definite relation, so one must resort to empirical methods. The exact scheme of proper subdivision is hard to figure out. The matter is one of common-sense convenience rather than of logical consistency, for it would clearly be finical and foolish to attempt to credit each one of many kinds of lighting service, for instance, with its own proper effect on the load factor. But when no intricate subdivision is attempted and the classification resolves itself merely into the separation of two radically different kinds of load the situation is simplified.

Plainly any betterment of operating economy due to the addition of an output that improves the load factor should be credited to that output and not used to help out something else. Now, in the case of mixed railway and lighting service it is quite feasible to get the average load curves due to each separately, and hence to sum these and obtain the improvement in general load factor due to the addition of railway load, or the injury to the load curve in the rare cases where it might occur. Now, if the total operating expenses are analyzed through the year it is not difficult to determine and to

express graphically the variation of cost per unit as a function of the load factor. This done, the segregation of the lighting and railway charges can be accomplished with some degree of fairness. The expense should be divided in proportion to the respective outputs, and then the railway load should be credited or debited with the gain or loss due to its effect on costs as shown by the cost-load factor curve. This is not quite the same thing as taking the costs as inversely proportional to the separate load factors, but is really a further step in the same general direction. The difference is due to the effect of the diversity factor, which cannot be predicted without knowledge of the time relations of the two load curves involved, and hence must be formed by experience. This whole matter of the diversity factor has been greatly neglected, although it is a most vital matter in central station economics of all classes. Even users of energy who are in apparently exactly the same class show extraordinary differences in actual use. Unless one takes account of this the consumer gets very much the short end of the bargain. Take, for instance, the case of a large group of residences using merely light. If each consumer is held for his individual demand justice is apparently satisfied, but, as a matter of fact, the station demand for the group will regularly be very much less than the sum of the individual demands, and since it is the group demand that is a factor in station expense, it is that which affects the expenses. The same principle holds in all classes of service, and in the case here under discussion, where the purpose is a straightforward segregation of expenses, the division should be made fairly upon the actual facts.

#### WELDING IN THE REPAIR SHOP

A most interesting development in electric railway shop practice is the increasing popularity of welding. It is remarkable to see how its field has spread from the simple repair of broken shafts and motor housings to such unexpected applications as the strengthening of blow-hole castings and the addition of metal patches to flattened wheels. Three distinct methods of welding are now available—the reaction, oxy-acetylene and electric processes. All of them can be made to give satisfactory results even in the hands of comparatively unskilled laborers.

So far as effectiveness and reliability are concerned there is little to choose between these three methods, and it is difficult to compare them on a net cost basis owing to the miscellaneous and variable character of the work done. Even the cost of repairing the same type of motor housing may vary within wide limits according to the character and location of the fracture. Consequently an elaborate, final comparison between the three systems is quite impracticable. In general, however, the cost per weld by the reaction and oxy-acetylene methods does not greatly exceed the cost of the welding chemicals, because the other charges are comparatively small. The cost of electric welding is likely to be more deceptive, because the master mechanic is prone to assume that he is getting current for nothing.

It should be pointed out here that the high amperage and low voltage required for electric welding can be obtained either through resistances or through a motor-generator set. The rheostatic scheme is rather crude and wasteful compared with a motor generator. It ought to prove cheaper to use the latter apparatus in shops where much welding is done and

where the cost of current is an appreciable factor. The reaction process has the greatest flexibility, because the necessary equipment can be set up almost anywhere without piping to tanks or wiring to power sources. It is therefore particularly useful for welding heavy articles, on the principle that it is easier to bring a horse to water than vice versa. On the other hand, the oxy-acetylene and electrical processes lend themselves more readily to the quick and convenient welding of small pieces in isolated places. Quite a few welding failures in all of the processes mentioned have been traced to the use of low-grade scrap for make-up metal. The metal added for a weld should consist of such materials that the welded portion will be even stronger than the rest of the structure.

#### THE LOCATION AND CONTROL OF STOREROOMS

In planning a large shop it is natural for the designers to place the several departments in the order which will best facilitate the dismantling and the later reassembling of the cars to be maintained therein. However, in some designs not enough care seems to be given to the logical location of the storerooms. In one installation recently visited the stockroom is so placed that many of the employees have to walk over 500 ft. each way to get their supplies. Under these circumstances there is a great loss of labor time by both the messengers and their co-workers who are in need of the material to finish the jobs. Of course, it is possible for each machinist to draw out at beginning work such articles as he may expect to use during the day and then to return the tools at night. Nevertheless, some trips to the storeroom are unavoidable, as for the exchange of checked tools and for emergency articles. It follows, therefore, that the storeroom should be located as centrally as possible, provided that supplies can be delivered to it conveniently and that its intermediate position offers no hindrance to the easy movement of work from one shop section to another.

Where the area covered by a shop is so large that even a centrally located general storeroom necessitates long trips for supplies from the departments farthest removed from the storeroom, the use of small auxiliary storerooms for each department saves time in drawing supplies and is not open to objection on the grounds of duplication of stock. The armature shop, for example, uses few, if any, of the supplies required in the truck shop, and the same thing is true in other departments. These departmental storerooms need not occupy valuable floor space, as they can be located in some convenient but out of the way corner or gallery. This plan has been followed in many large steam railroad repair shops and manufacturing establishments and has resulted in economy of both time and space.

The experience of some companies has shown that it is more desirable to have the control of all the storerooms, both in the main shops and elsewhere, in the hands of a general storekeeper than in those of the several department managers. The tendency in separately operated storerooms is to carry too much stock, and besides each depot is sure to have an independent supply of utensils which are used by more than one department. These disadvantages are minimized when the supply service is concentrated under one man who has a broad knowledge of the stock conditions throughout the system. Moreover, the storekeeping accounts can be kept with greater accuracy by a specialist than by half a dozen different men to whom such work is only an incident in their duties.



## POWER SUPPLY

The Second Avenue Railroad buys all of its power from the Metropolitan Street Railway and the Third Avenue Railroad. It claims to have an equity of \$750,000 in the Ninety-sixth Street power station of the Metropolitan Street Railway, but has no part in the management or operation of the station. Direct current is supplied from the substations of the two companies

all renewal work 9-in., 122-lb. No. 438 Lorain rail has been used and the joints have been made with 12-bolt joint plates. A number of the crossings and curves have been renewed with manganese steel and new cross-overs have been installed on Second Avenue at Sixty-sixth Street and 116th Street.

The present downtown terminal of the Second Avenue line is at Bayard Street and the Bowery, near Chatham Square. The



Second Avenue Railroad—View of Car House from First Avenue and Ninety-sixth Street

from which power is purchased and it is distributed through cables and ducts which are owned and maintained by the Second Avenue Railroad Company. All current which is purchased is metered at the substations. A total of nearly 9,500,000 kw-hours is required per year for heating, lighting and propelling the cars and supplying power and light in the shops and the car house.

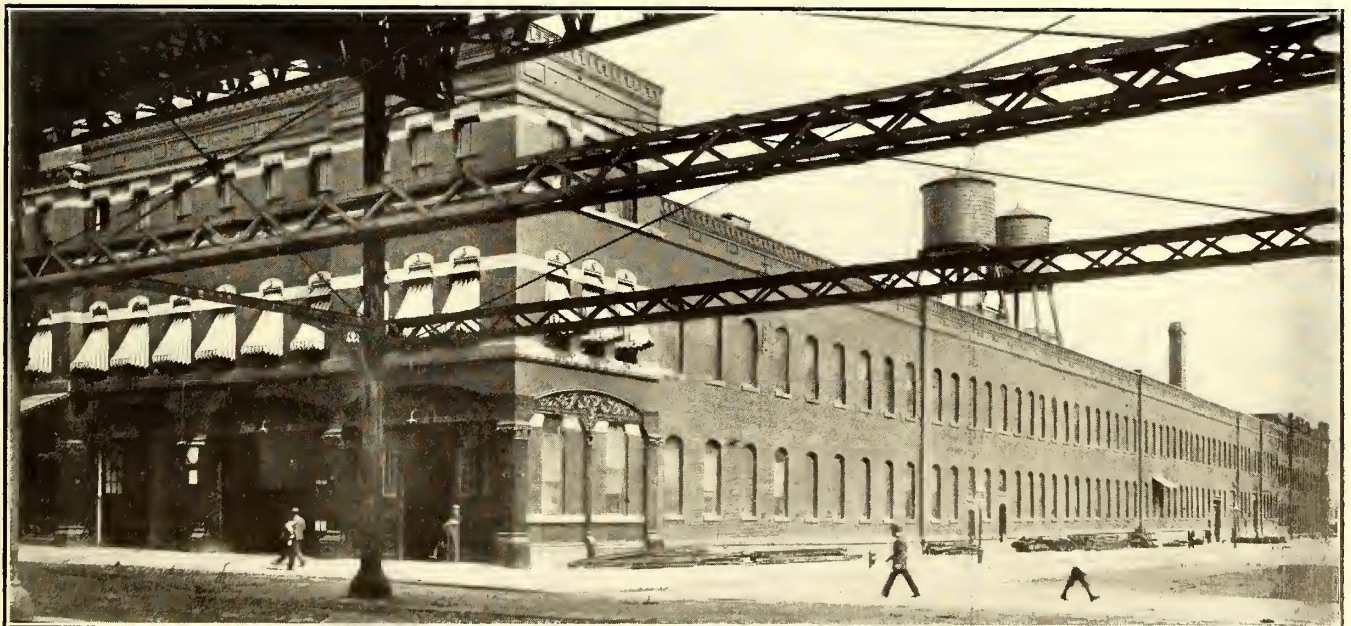
## TRACK REHABILITATION AND CONSTRUCTION

Extensive repairs to the company's tracks were made during the summer of 1909 and the early part of 1910. The First Avenue division, which was electrified only a few years ago, was in good condition and it has required only light repairs. The track on the southern end of the Second Avenue line below Twenty-third Street and a section on Second Avenue be-

company owned a franchise for a horse car line extending from the Bowery west on Worth Street to Broadway, and during the past summer a double-track electric-conduit line has been built on Worth Street so as to provide a new terminal at Broadway. This new construction comprises about 0.8 mile of track.

## NEW CAR HOUSE AND SHOPS

The old car house and shops of the Second Avenue Railroad and the barn of the First Avenue horse car line covered the entire block, 700 ft. by 200 ft., bounded by First and Second Avenues and Ninety-sixth and Ninety-seventh Streets. The east end of the building, fronting on First Avenue, was a three-story structure with brick walls and wooden floors and framing. When the First Avenue line was changed to electric



Second Avenue Railroad—View of Car House from Second Avenue and Ninety-sixth Street

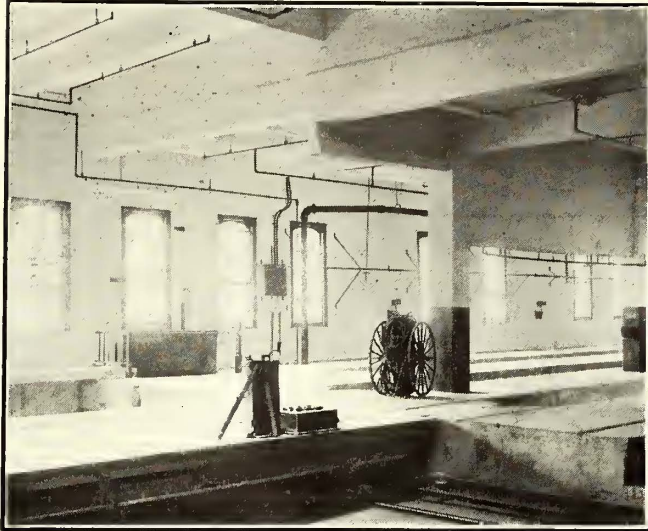
tween Sixtieth Street and Eighty-fourth Street required complete renewal of the running rails, joints, paving and in some places of the slot rail. Temporary repairs were made to the track during the winter of 1908-1909 by inserting "dutchmen" under the rails on the yoke bearings, but this was followed later by complete renewal of the worst pieces of track. For

operation a transfer pit and table were installed on the first floor and this end of the building was converted into an inspection and storage shed for the cars of this division. The Second Avenue Railroad car house and shops comprised a two-story structure with concrete floors and steel framing, fronting on Second Avenue and extending back on Ninety-sixth and

Ninety-seventh Streets about 500 ft. The fire in February, 1908, which destroyed the Second Avenue car house, left only the side walls of this section of the building standing, but the First Avenue section of the building was not seriously damaged. In the spring of 1909 the receiver of the Second Avenue Railroad had plans drawn for a new two-story, reinforced-concrete, fireproof car house to be built on the site of the old building.

floors by two Reedy electric elevators with a capacity of 20 tons each. These elevators run in fireproof shafts and the openings on each floor are enclosed by steel rolling doors which close by gravity unless held open by securing the operating chain.

The shop facilities comprise an armature room, a blacksmith shop, a machine shop, an impregnating room and a boiler-room



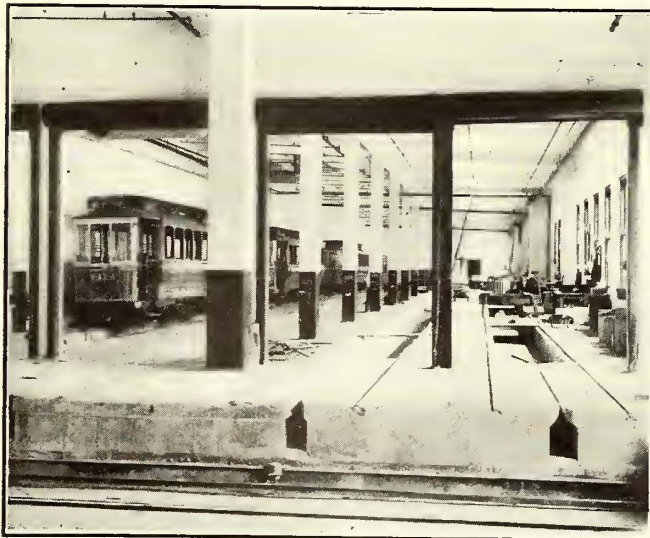
Second Avenue Railroad—Transfer Table and Chemical Engine



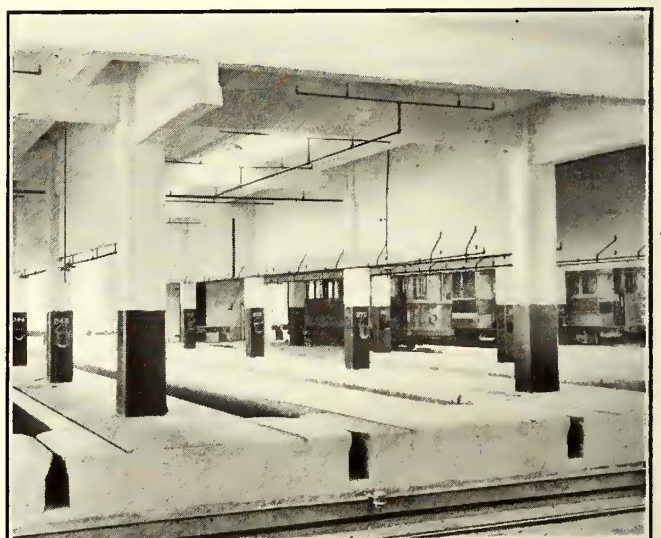
Second Avenue Railroad—Interior of Fireproof Paint Storage Room

The new building was completed in February, 1910, and now affords ample storage and shop facilities. The ground floor is used for storage and inspection of cars in service, while the second floor is used for storage and also provides room for a large carpenter shop and paint shop. Each floor of the building is divided into three sections by two transfer table pits 24 ft. wide, which extend across the entire width of the building. Two transfer tables are operated in each pit. The first-floor tracks are all equipped with channel rail in each conduit, so that cars may be moved without using jumpers. The channel rails, however, carry current only while the transfer table is directly opposite the end of the track, as the current is supplied to the

on the first floor along the Ninety-sixth Street side of the building; a carpenter shop 304 ft. x 47 ft. on the second floor along the Ninety-sixth Street side, and a paint shop also 304 ft. x 47 ft. on the second floor along the Ninety-seventh Street side. The carpenter and paint shops each contain four tracks with shallow pits below. At the east end of each shop are storerooms 33 ft. x 22 ft., which are cut off from the remainder of the building by heavy fire walls and fireproof doors. In the boiler room on the first floor of the building are installed two boilers for heating the building. One of these boilers has been converted into a high-pressure unit for supplying steam to the impregnating plant in the adjoining room. The impregnating plant is of the



Second Avenue Railroad—Carpenter Shop on Second Floor. The Cars Here Are Moved by Jumpers



Second Avenue Railroad—Second Floor, Showing Curtain Walls and Overhead and Aisle Sprinklers

channel rails through shoes on the end of the transfer table. On the second floor none of the track conduits have channel rails, and all cars are moved with jumpers connected to the transfer tables. All storage tracks on both the first and second floors are laid on a level grade.

Cars are raised or lowered between the first and second

steam-jacketed type made by the Buffalo Foundry & Machine Company.

In the front of the building beside the main entrance track on Second Avenue is a large sand-drying and storage room, in which are placed two stove driers. Quarters for the emergency crew occupy the corner of the building on Second Avenue and

Ninety-sixth Street. All lighting and power circuits in the building are controlled by two switches in this room. By opening these switches current is cut off in all parts of the building, so that in case of fire the firemen would not be exposed to danger from electric shock.

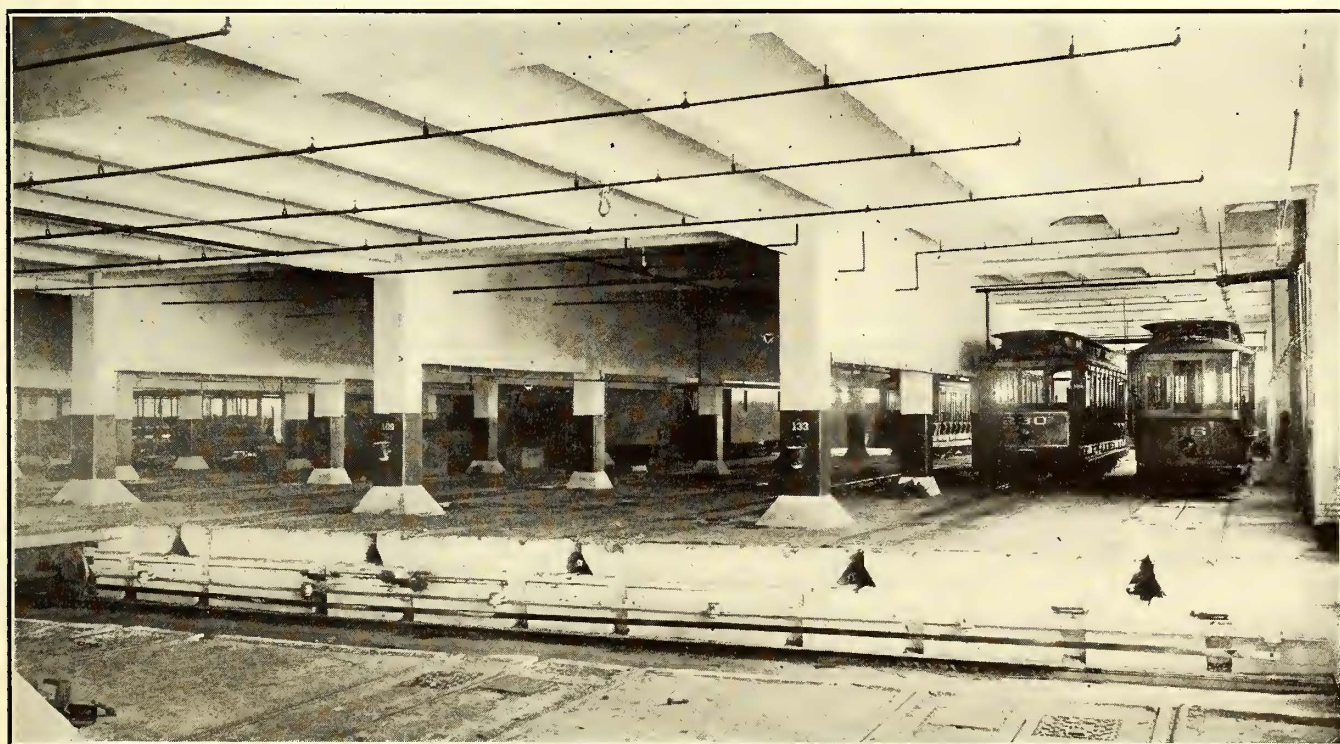
FIRE PROTECTION

The interior of the building is constructed throughout of reinforced-concrete posts, girders and floor and roof slabs. Between each bay of two tracks a curtain wall is carried down between the columns from the ceiling to the height of the car eaves. The transfer table openings at the end of the paint and carpenter shops are closed with steel rolling doors. The principal dependence for protection against a fire originating in a car is placed in the elaborate system of automatic sprinklers which has been installed throughout the building. A row of sprinkler heads is mounted along the bottom of each curtain wall and a row of ceiling sprinklers is placed over the center of each track. Nearly 4000 Rockwood sprinkler heads are used in the building. The system is supplied with water from two 20,000-gal. storage tanks and four pressure tanks mounted on the roof. In addition to the sprinkler equipment, a fire pail is

First Avenue to Eighty-sixth Street, west to Second Avenue, south on Second Avenue to Stuyvesant Place, through Stuyvesant Place and Astor Place to Broadway. The length of this route is 4.6 miles. Transfers are exchanged with the Metropolitan crosstown lines at Twenty-third Street and Thirty-fourth Street only:

During April, 1910, when the largest number of passengers was carried, the company operated a maximum of 57 cars on the Second Avenue division, 14 cars on the First Avenue division and 28 cars on the Astoria Ferry and Astor Place division. The average headway on the Second Avenue division during the middle of the day was 3½ minutes and during the rush hours was 2 minutes; on the First Avenue division 5 minutes during the middle of the day and 4 minutes during the rush hours, and on the Astoria Ferry division 4 minutes during the middle of the day and 2 minutes during the rush hours.

The accompanying table gives the principal operating statistics of the Second Avenue Railroad as reported to the Public Service Commission of the First District of New York for the year ended June 30, 1910. The revenue per car mile is nearly one-third lower than the average of the Third Avenue Railroad



Second Avenue Railroad—Transfer Table and Pit on Ground Floor, Showing Contact Blocks for Making Conductor Rails in Conduit Alive

hung on a hook on each column in the building. The columns are all numbered and all pails are numbered in accordance with the columns on which they are placed. Two hand chemical engines also are in readiness for instant use. The building is now being wired for a Manhattan fire-alarm equipment, which will be connected to the city fire-alarm system. An inspector is employed whose only duties are to examine every fire pail and other piece of fire apparatus each day and to test the sprinkler system thoroughly every morning. These fire-protection devices have resulted in reducing the insurance rate on the building and contents from \$1.05 to 26 cents.

OPERATION

The Second Avenue Railroad at present is operated in three divisions. The first division is from 129th Street and Second Avenue to Bayard Street and the Bowery, a distance of 7.2 miles. The second division includes the line on First Avenue from 125th Street to First Avenue and Fifty-ninth Street, terminating at the west end of the Queensboro Bridge, a distance of 3.3 miles. The third division includes the line from the Astoria Ferry at Ninety-second Street and East River down

and Metropolitan Street Railway systems. As will be seen from the table, the ratio of operating expenses to operating revenue is also very high. This can be accounted for largely because of the fact that it has not been possible to put the rolling stock

STATISTICS OF OPERATION OF SECOND AVENUE RAILROAD FOR YEAR ENDED JUNE 30, 1910

Revenue car miles.....	3,465,352
Cash passenger fares.....	14,921,441
Transfers collected.....	980,438
Operating revenue.....	\$829,402
Operating expenses.....	\$719,256
Revenue per car mile, cents.....	22.97

in proper operating condition up to the present time and the constant breakdowns have not only disarranged the schedules but have required an abnormally large number of cars and crews to be kept in readiness for service. When the new motor equipments which have been ordered are installed a much better showing is expected.

DISTRIBUTION OF TRAFFIC

Like most of the other surface railway lines in New York, the Second Avenue Railroad does a somewhat larger business in summer than in winter. This is due partly to pleasure riding

and partly to the fact that many people in hot weather take the surface cars in preference to using the subway or elevated roads. The following table gives by months the fare passengers carried by the Second Avenue Railroad from July, 1909, to July, 1910, inclusive:

NUMBER OF FARE PASSENGERS CARRIED BY MONTHS FROM JULY, 1909, TO JULY, 1910, INCLUSIVE

Month	Number Passengers
July, 1910.....	1,694,123
June, 1910.....	1,534,679
May, 1910.....	1,387,438
April, 1910.....	1,235,884
March, 1910.....	1,187,502
February, 1910.....	1,011,939
January, 1910.....	1,074,085
December, 1909.....	1,226,528
November, 1909.....	1,296,257
October, 1909.....	1,430,342
September, 1909.....	1,467,616
August, 1909.....	1,557,982
July, 1909.....	1,562,362

**DESIGN OF CARS FOR CHICAGO STREET RAILWAYS**

The second annual report of the Board of Supervising Engineers, Chicago Traction, includes considerable interesting information about the design of the new street cars of the Chicago City Railway and the Chicago Railways Company.

**PAY-AS-YOU-ENTER CARS**

On November 24, 1907, the Chicago City Railway Company installed a complete service of pay-as-you-enter cars on its Cottage Grove Avenue line, which carried the heaviest travel on the South Side of the city. This service was the first general use and practical test of the efficiency of the "P-A-Y-E" car in the United States. The following figures will illustrate the practical results of the "P-A-Y-E" service from an operating standpoint:

	Receipts	Car Hours	Receipts per Car Hour
Nov. 24, 1907, to Jan. 31, 1909.....	\$1,808,321.52	702,395	\$2.57
Nov. 24, 1906, to Jan. 31, 1908.....	1,686,712.17	796,843	2.12
Increase .....	\$121,609.35	94.448*	.45
Per cent .....	7.2	11.9*	21.2
Per cent increase or decrease all lines .....	2.8	3.0*	6.0
Per cent increase or decrease due to P-A-Y-E cars.....	4.4	8.9*	15.2

\* Decreases.

**ACCIDENTS.**

Falling at curve, falling in cars, from cars, boarding, leaving, or flipping cars:

Nov. 24, 1907, to Jan. 31, 1909.....	1,280
Nov. 24, 1906, to Jan. 31, 1908.....	1,821
Decrease .....	541, or 31.9 per cent

It will be noted in the above statement that after allowance has been made for the general increase in business the "P-A-Y-E" car shows: (1) Closer collection of fares; (2) reduction in car hours, which means greater rapidity in receiving and discharging passengers as well as economy in operation; (3) increased receipts per car hour, and (4) a most beneficial reduction in the number of accidents.

**DESIGN OF STANDARD CAR**

About the first of the year the board took under consideration the practicability of securing a type of car which would eventually become the standard type of car operated on all surface lines within the city. The situation briefly as to size of cars at that time was: The Chicago City Railway Company's new pay-as-you-enter cars were 9 ft. wide over all and 48 ft. 3 in. long. This was the widest and roomiest car in operation on any of the lines in the city. The width of double-truck cars in operation varied from 8 ft. 9 in. to 8 ft. 3 in. The objectionable feature of this variance primarily was that it was contemplated in the installation of through routes that cars of one company would travel and be housed in the territory of another company. To make this condition ideal it was admittedly of the greatest importance that as soon as possible all cars so operated should be of standard size. This would also mean, of course, that the repair parts would be interchangeable and the repair pits in the car houses of one company would readily accommodate the cars of the other company, so that the service could be carried on uninteruptedly.

On Feb. 13, 1908, comparative average performances of cars were submitted, with the relative speed of the different types. The statement shows an increase in scheduled speed of 16 per cent over what it was in 1906 and 9.34 per cent over what it was in 1907. The statement follows:

**COTTAGE GROVE AVENUE LINE.**

	Schedule Speed in Miles per Hour.
January, 1906—Cable operation.....	7.68
January, 1907—Some single-truck and double-truck cars..	8.13
January, 1908—All double-truck cars.....	8.89
Increase since 1906, 16 per cent.	
Increase since 1907, 9.34 per cent.	

**INDIANA AVENUE LINE.**

January, 1906—Cable and electric operation.....	7.76
January, 1907—All electric equipment.....	8.14
January, 1908—All double-truck cars.....	8.64

**STATE STREET LINE.**

January, 1906—Cable operation.....	7.60
January, 1907—Electric operation single-truck and double-truck cars.....	8.25
January, 1908—All double-truck cars.....	8.81

**WENTWORTH AVENUE LINE.**

January, 1906—Electric operation double-truck cars.....	8.88
January, 1907—Electric operation double-truck cars.....	8.86
January, 1908—Electric operation double-truck cars.....	8.92

Early in 1908 the board made a careful study to assist in designing new cars for the Chicago Railways Company. The pay-as-you-enter car, in operation in Chicago and other cities, was carefully investigated and this design was believed to be a practical type to adopt as standard for Chicago. Among the reasons leading to its adoption may be mentioned the following:

Reduction in accidents, since passengers getting on or off the car are under the eye of the conductor or motorman.

Increased comfort to passengers, as conductor remains upon rear platform and does not have to elbow his way through a crowded car.

Elimination of the confusion incident to loading and unloading the old type of car. On the P-A-Y-E car entering and leaving passengers are separated by railings, and the front platform is for "exit only."

Better running time, as the elimination of confusion at loading and transfer points enables the car to get under way more quickly.

The collection of all fares, as the passenger must pay when entering the car.

The Board of Supervising Engineers, after discussing the various types and dimensions of cars submitted, determined upon the following general dimensions for the new cars for the Chicago Railways Company:

Type of car to be double-end pay-as-you-enter.

All cross seats to be not less than 36 in. in length, all of which shall be cushioned.

The center aisle to be not less than 23 in.

Height of car from top of rail to top of trolley board to be not less than 11 ft. 8 in. nor more than 11 ft. 10 in.

Length over corner posts to be not less than 32 ft. nor more than 32 ft. 5 in.

Length of platform to be 8 ft. 4½ in.

Length of car over all to be not less than 48 ft. 9 in. nor more than 49 ft. 2 in.

Width of car over all to be not more than 8 ft. 9 in.

Truck centers to be 20 ft. to 20 ft. 5 in.

It also was provided that the cars should be constructed in accordance with general specifications to be prepared by the chief engineer of the work. Various designs were submitted by the car builders embodying their ideas as to details of construction. These plans and drawings were analyzed and their suitability studied. After careful consideration as to weight and strength, a plate girder type of under frame was decided upon, and a detail specification was prepared by the rolling stock division of the board covering a car embodying the best features of the various designs submitted by the car builders. This detail specification provided for a car having dimensions within the above requirements and a seating capacity for 40 passengers. The details of the car framing were studied with regard to strength and finish, due regard being given to keeping





## CAR WHEELS

To the subject of car wheels careful thought and attention have been given. The wheels in use at the time this subject was taken up were of cast iron, and while they had been designed with reference to long life and minimum wear on the track and expensive special work, the fact that flat spots developed easily in them caused great annoyance to persons living along the car lines. These cast-iron wheels were comparatively heavy, weighing about 570 lb., because of the strength required and also because they had a wide tread to minimize the wear on special work. Rolled-steel wheels were in use in other cities and a few were running in Chicago. Investigation showed that flat spots scarcely ever occurred on these wheels, and when they did develop they soon were rolled out automatically in the operation of the car. The steel wheel, therefore, obviates the chief objection to the cast-iron wheels in that it is practically noiseless. Steel wheels can also be made much lighter than those of cast iron. Their life is greatly in excess of the cast-iron wheel, thus effecting a large economy. These and other facts influenced the Board of Supervising Engineers after thorough investigation to decide upon the exclusive use of steel wheels for both railroad companies as rapidly as the cast-iron wheels could be replaced. Accordingly contracts were entered into by both the Chicago City Railway Company and the Chicago Railways Company for rolled-steel wheels for all present cars, new cars and requirements till 1911.

In the design of a steel wheel the chief points that had consideration were contour of tread and flange, depth of flange, width and thickness of rim and weight of wheel. The contour of the tread and flange of the standard wheel are shown in the cut on page 905. The weight of these steel wheels will average about 500 lb. for the 1 $\frac{7}{8}$ -in. thickness of rim and 525 lb. for the 2 $\frac{3}{4}$ -in. thickness of rim. The chemical composition of the wheel was so adjusted that the steel in the wheel would be somewhat softer than that in the rail, so that the wear in service would come largely on the wheel, thus prolonging the life of the rails.

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**HEARING ON NEWBURYPORT FARES**

The Massachusetts Railroad Commission gave a hearing at Boston on Oct. 19 upon the petition of the Mayor and Aldermen of Newburyport for a readjustment of fares on the lines of the Citizens' Electric Street Railway, the Boston & Northern Street Railway, and the Haverhill & Amesbury Street Railway. The petitioners' case was conducted by Arthur Withington, City Solicitor of Newburyport, and the companies were respectively represented by the following counsel: Guy Murchie, Boston; Bentley W. Warren, Boston, and S. W. Emery, Haverhill. The petitioners contended that the existing fares are excessive, and urged that every passenger boarding a car upon any of the above roads in Newburyport be entitled to a free transfer on any one of the other lines to the end of the first 5-cent fare limit of the latter. A reduction in the present 10-cent fare to 5 cents was also asked on the Haverhill & Amesbury Street Railway between Market Square, Newburyport, and the Massachusetts-New Hampshire State line, between the towns of Salisbury and Smithtown. The cars of all three companies are now run to Market Square, Newburyport.

Chairman Hall said to the petitioners that their demand of an inter-company transfer was only another way of saying that they wanted the present fare cut in two. The petitioners contended in regard to the desired establishment of a 5-cent fare to Smithtown that the original franchise grant forced the company from a moral point of view to charge only 5 cents for this service. Chairman Hall said that the Massachusetts Supreme Court had declared that a conditional franchise is not a binding agreement, and endeavored without success to obtain a statement from the petitioners as to their view of the moral effect of an agreement which time showed to be financially impossible. Chairman Hall stated that the board had no jurisdiction over that portion of the Haverhill & Amesbury line which is in Smithtown, since it is without the State.

Bentley W. Warren, for the Boston & Northern Street Railway, stated that the only line of this system which had been mentioned is the branch formerly known as the Georgetown, Rowley & Ipswich Street Railway, which was built for the sole object of accommodating travel from outlying districts south of Newburyport into the city. Cars entering the city on this line run for a short distance over the tracks of the Citizens' company. The line was never profitable and paid practically nothing in dividends. The condition of the property was bad when the Boston & Northern purchased it. Mr. Warren said that the proposition to exchange transfers with the other companies would never have been considered for a moment, and if insisted upon the line would not have been built. There was no reason why the line should be required to carry further losses. It had proved to be a boon to the localities through which it passed, but it could not stand any dilution of its scanty revenues. A 5-cent fare was maintained on the line from Market Square, Newburyport, to Dummer Academy, which was 4.8 miles distant.

Samuel W. Emery, for the Haverhill & Amesbury company, referred to the petitioners' claim that a 5-cent fare is charged on the Amesbury & Hampton Street Railway for a longer ride than between Newburyport and Smithtown. The company had tried both a 6-cent and a 10-cent fare between Smithtown and Amesbury, but the patronage fell off so much that the results were less satisfactory than with the original 5-cent fare, which had been restored. Mr. Emery said that the company would much prefer to charge a 10-cent fare if it were possible between these points, just as that rate prevailed between Newburyport and Smithtown.

President D. A. Belden, of the Haverhill & Amesbury Street Railway, stated that previous to July 10, 1909, the fare between Newburyport and Smithtown was 5 cents, the distance being 5.17 miles. On that date the fare was raised from 5 to 10 cents, 5 cents being charged to Salisbury Square and 5 cents from the latter point to Smithtown. Simultaneously with the increase a workingman's limited ticket was issued giving 50 trips between Smithtown and Newburyport at a cost of \$3.75, or 7.5 cents per trip. Up to Dec. 1, 1909, only 10 of these books had been sold, and in view of the fact that the majority of people in the Smithtown district received low wages and did not appear to be able to invest \$3.75 in tickets at any one time, and also because of competition on the Boston & Maine Railroad, the company inaugurated an unlimited ticket book containing 12 trips at the price of 90 cents, or the rate of 7.5 cents per trip, but with the evident advantage of reduced investment expense. Between Dec. 1, 1909, and Oct. 1, 1910, 715 of these 12-trip tickets were sold. Mr. Belden said that in the last 10 years the Haverhill & Amesbury company had accumulated a deficit of about \$110,000. Chairman Hall said that if the revenue of the company between Smithtown and Newburyport had been all profit it would still be impossible to pay a 6 per cent dividend. Mr. Belden stated that in October, 1908, with the 5-cent fare in force, it was estimated that 11,729 passengers traveled between Smithtown and Newburyport, giving a revenue of \$586.45; while in October, 1909, with the 10-cent fare operative, 8947 passengers were carried, with a corresponding revenue of \$894.70. Thus there was a gain in the month of about \$310, with a loss in the number of persons carried. Mr. Belden said that the company could not afford to lose any revenue in Newburyport through the use of inter-company transfers.

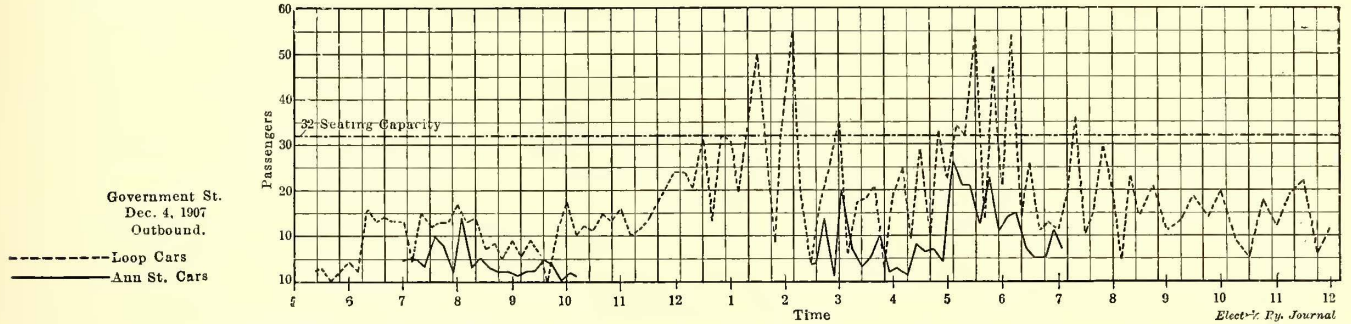
Guy Murchie, for the Citizens' Electric Street Railway Company, contended that it was impracticable to extend local transfers on the Newburyport system further. The system was in general Y-shaped, and transfers were given at all necessary points. The company had about 12 times as much trackage in Newburyport as the other roads and it would not be feasible to arrange a fair distribution of earnings per passenger upon such a basis. The company should not be obliged to reduce its income. It paid 5 per cent dividends in the last two years with a surplus of only \$5,000, which was perilous in view of the possible cost of a single serious accident.

The board took the case under advisement.

**TRAFFIC NOTES FROM MOBILE**

During the year 1909 the Mobile (Ala.) Light & Railroad Company operated a total of 58.2 miles measured as single track and carried 12,670,930 passengers, composed of 10,791,569 revenue and 1,879,361 transfer passengers. The respective numbers of revenue and transfer passengers for 1908 were 11,102,571 and 1,902,203, and for 1907 were 11,925,160 and 1,938,494. The decline in traffic since 1907 was due to a falling off in Mobile industries, notably in the lumber market. However, it appears that the traffic for 1910 will be greatly improved, judging by the business for the first four months of the calendar year.

the other, known as the Ann Street line, ran during certain hours over the same tracks for 1¼ miles and was then turned back. By comparing the two traffic curves with the horizontal line expressing the 32-passenger capacity of the loop cars, it was found that the latter were being overloaded, whereas the 30-passenger Ann Street cars were being underloaded. On looking into the cause of this unequal loading, it was found that many people who could have used the trippers preferred to wait for the other cars because their companions were going beyond the limits of the Ann Street line. At this time a 10-minute schedule was given except when the Ann Street cars were run every 5 minutes. The experiment then was tried of starting the Ann



Mobile Traffic—Curves Showing Comparative Use of Through Cars and Trippers

An important factor in the increase shown so far was the annual reunion of the Confederate veterans, which this year was held in Mobile on April 26, 27 and 28. The camping grounds were chosen on ground adjacent to Monroe Park, the company's amusement resort, and to the baseball grounds of the Mobile Club of the Southern League.

Street cars 2 minutes ahead of the loop cars, but this brought no relief. It was finally decided to run the Ann Street cars over the full loop route during the morning and evening rush hours.

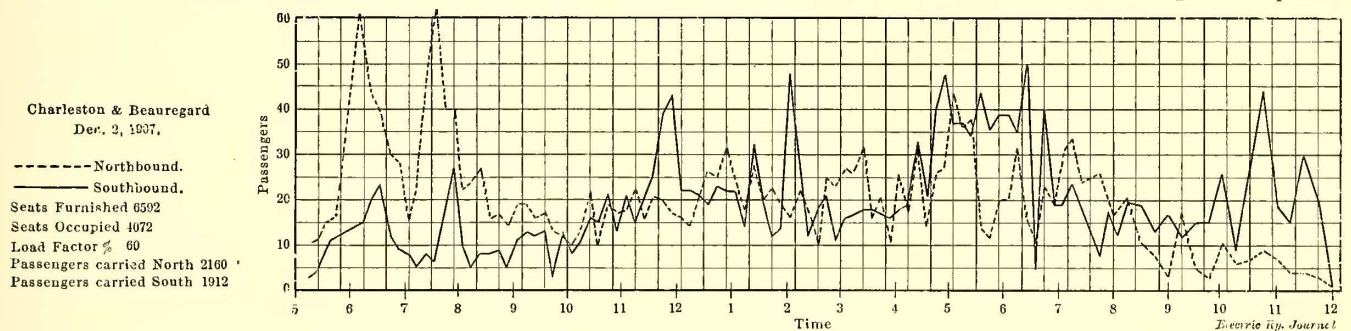
The park and ball grounds mentioned are located directly opposite the car house and shops of the company, thus making it easy to have available the maximum number of cars and to minimize dead mileage. Monroe Park is on the shore of the Mobile Bay and is quite an elaborate resort. It is opened about the middle of April. The park attractions include theatrical performances, band concerts, deer enclosure, roller coasters and a host of minor concessions.

The fact that the Ann Street cars had longitudinal seats, while those on the loop line had transverse seats, evidently was not the reason for the favoritism shown, as in another instance the same effect occurred where the through cars and the trippers were of exactly the same type.

By referring to the figures previously given, it will be observed that in 1909 about 17 per cent of the passengers rode on transfers. To minimize transfer abuse, the company has the

**STEEL GUARD FOR PAVING LAID AGAINST T-RAIL**

Even in those cities where traffic regulations to divert the vehicular traffic from the street railway tracks are enforced the wear on the pavement between and adjoining the rails ordinarily is more rapid than in the main roadway, particularly where T-rails are used, without any form of guard or protec-



Mobile Traffic—Ratio of Seats to Passengers, etc.

tickets printed in six different colors and the management arbitrarily decides from day to day the shade to be used.

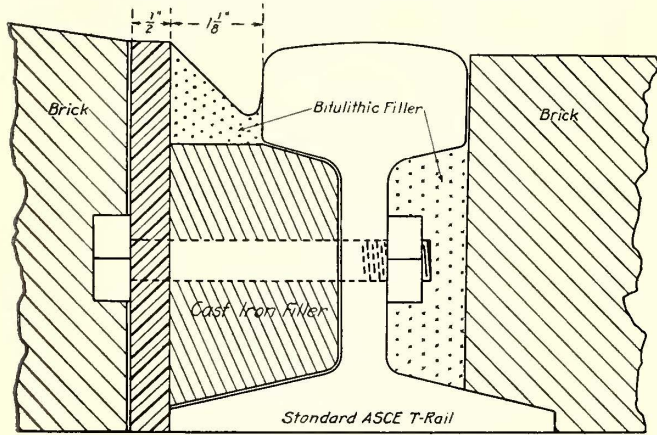
**TRAFFIC CURVES**

The Mobile management has found it worth while to prepare traffic curves from time to time, as these betray peculiarities in travel in a much more striking manner than simple tabulation. Curves which show the relationship between the seats furnished and the seats used have been found particularly valuable in arguments with the municipal authorities, newspapers and private citizens as to the character of service offered. Thus, the curve reproduced to cover the operation of the Charleston and Beauregard line on Dec. 2, 1907, shows the seat-use factor to have been as low as 60 per cent.

The second set of curves shows the inbound and outbound travel on two lines, one of which made a complete loop, while

tion. The common practice of paving against T-rails is to carry the paving bricks or other paving material under the head of the rail. This tends to depress the pavement 1 in. or more below the top of the rail, and, in addition, the pavement is usually crowned from ½ in. to 1 in. above the top of the rails in the center of the track. With this construction there is always a marked tendency for the pavement to wear out quickly for a distance of about 6 in. or 8 in. from the inside of each rail. To overcome this common defect, which adds greatly to the cost of maintaining the pavement, the Citizens' Railway, of Waco, Tex., has adopted the ingenious construction shown in the accompanying engraving. This construction permits the use of a T-rail and provides a wide groove. A flat bar of steel ½ in. thick is used as a guard. It is held in place with bolts inserted through cast-iron spacer blocks, placed at inter-

vals of 5 ft. along the rail. The blocks fit under the head of the rail and are sufficiently thick to provide the necessary flange-way. The guard bar is supported vertically on top of the ties. With this construction the bricks or other paving material can be brought up flush with the guard bar without using an excessive crown in the center of the track. The space between

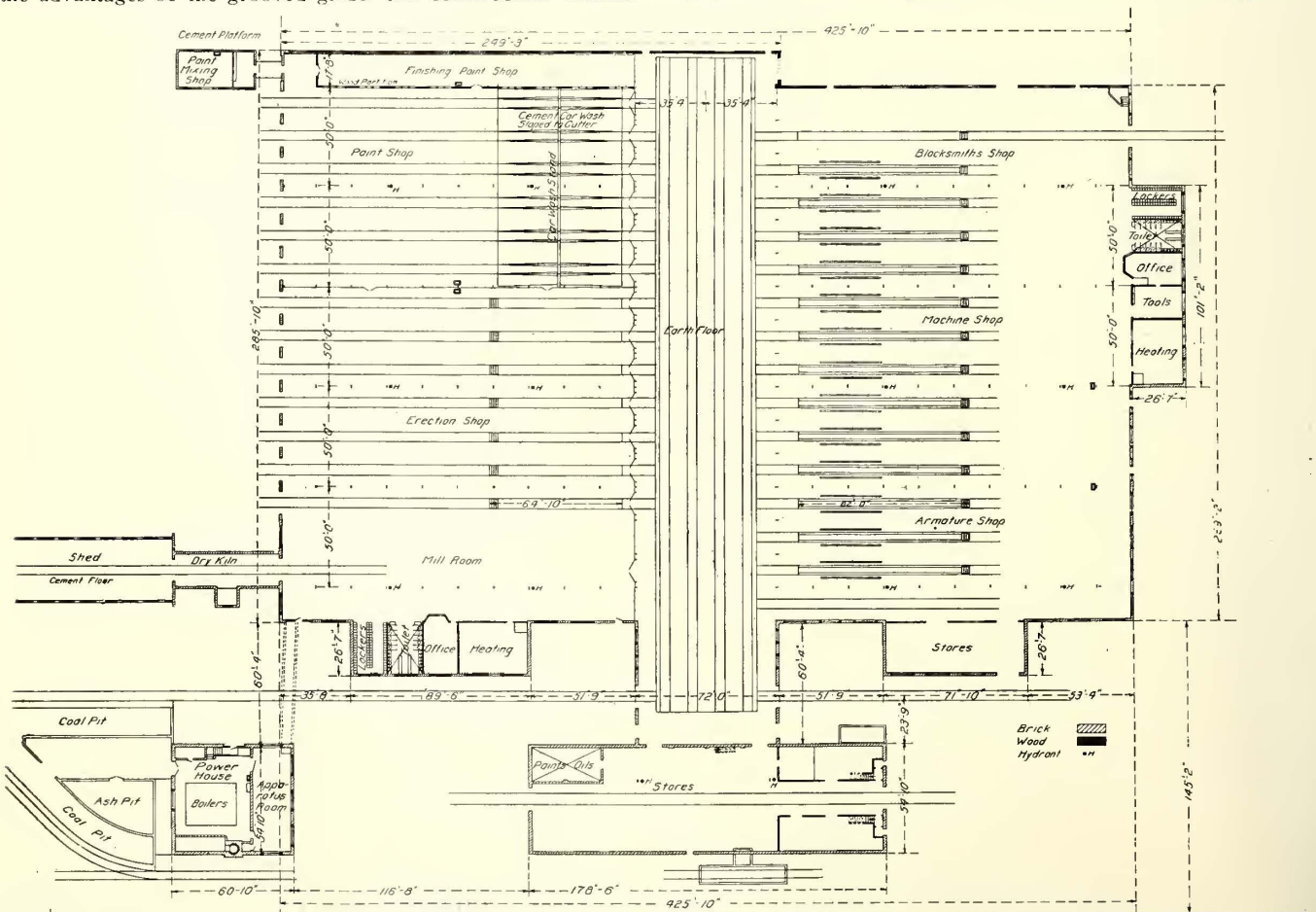


Steel Guard for Paving

the running rail and the guard is filled with bitulithic or other similar filler, leaving a groove of sufficient depth to clear the wheel flanges but not deep enough to injure the tires of vehicles. This form of guard construction is said to have all the advantages of the grooved girder rail construction without

### NEW SHOPS OF THE MONTREAL STREET RAILWAY

The Montreal Street Railway has just begun the construction of a car building and car maintenance plant which will cost about \$1,000,000. The location is in the suburb of Youville, where the company owns a plot of ground large enough to take care of all probable extensions. The installation will comprise a shop structure approximately 425 ft. 10 in. long x 269 ft. 2 in. wide; a lean-to for stores 178 ft. 6 in. x 54 ft. 10 in. wide, and an isolated power house 60 ft. 10 in. x 54 ft. 10 in. from which heat and power will be transmitted to the shops by means of a tunnel. All of the buildings are to be constructed of Laprairie plastic bricks and Montreal limestone. The floors of the various shops and storerooms will be of cement and the pits will be of concrete. As shown in the accompanying plan, the main building will be divided into two sections by a transfer table pit. The first section of the building will contain a paint shop, erection shop and mill room with office, toilet and locker rooms alongside the last-named shop; the rear section will contain the blacksmith shop and armature shop with auxiliary storeroom and a second series of utility rooms. Pits will be provided throughout the main building except in the paint shop, where a portion of the floor will be sloped to drains for car washing. There will be no partitions between the several shops except one of corrugated galvanized iron between the paint and erecting shops and a similar partition with galvanized iron swinging track doors will extend alongside the transfer table pit at the rear of the paint, erection and wood-working shops. To minimize the danger of fire, the paint mixing quarters have been placed in a small isolated building near



Plan of the Montreal Street Railway Company's Shops Now Under Construction

the disadvantages. The cost is considerably less than the excess cost of girder rail over ordinary T-rail. The standard A. S. C. E. T-rail sections can be used in brick pavement, whereas with the ordinary form of construction special high T-rails are required in order to provide room for the bricks under the head of the rail.

the paint shop. It will be observed from the plant that the dry kiln and woodshed also are practically separated from the mill room. The main storeroom contains a special fireproof section for paints and oils as indicated. Water for fire-fighting and other purposes will be available from a large number of fire hydrants located as shown on the accompanying general plan.

## APPLICATION FOR REHEARING IN THIRD AVENUE REORGANIZATION CASE

Formal application has been made to the New York Public Service Commission for the First District by the Third Avenue Railway Company and the committee representing holders of the consolidated mortgage 4 per cent bonds of the Third Avenue Railroad Company for a rehearing of the plan for reorganization, which was disapproved by the commission. An abstract of the opinion in which the commission disapproved the plan was published in the issue of the *ELECTRIC RAILWAY JOURNAL* for Aug. 13, 1910, page 262. A rehearing is asked on the ground that the order of the commission denying the application is "unjust and unwarranted and should therefore be abrogated and changed."

An abstract of the grounds upon which the application for a rehearing is based follows:

*First.*—That the commission misapprehended the law and the authority conferred upon it by assuming that it was authorized to proceed under the law so as to give a retrospective operation and impair existing contract obligations and rights, contrary to the provision of Section 10 of Article I of the Constitution of the United States.

"That the public service commission law, in so far as it has been construed by the commission as preventing the reorganization in the manner proposed, and as preventing the capitalization of any franchises or the right to own, operate or enjoy any franchise whatsoever belonging to the company or its subsidiary companies, is unconstitutional and void.

*Second.*—That the commission misapprehended its legal power and misconstrued the public service commission law by refusing to grant an order authorizing the issue of stock and bonds in view of proof of all the facts necessary to be proved, including the following: (1) that the agreement of reorganization had been entered into in conformity with the stock corporation law; (2) that the purchasers had acquired title to the property and franchises at foreclosure sale pursuant to the decree of a court of competent jurisdiction and to said plan of reorganization; (3) that the new corporation had been duly organized pursuant to such plan and the provisions of law; (4) that the new corporation had entered into the agreement between it and the purchasers at foreclosure sale and the bondholders' committee; (5) that the acquisition by the new corporation of the property and franchises was duly authorized by its certificate of incorporation; (6) that the terms of the agreement of May 20, 1910, were in the unanimous opinion of the board of directors advantageous to the best interests of the reorganized corporation; (7) that the terms provided in said plan of reorganization for the debts or liabilities of the former corporation had been approved by all the agents or trustees entrusted with the plan of reorganization; (8) that the use of the capital to be procured by the proposed issue of stock and bonds was reasonably required for the lawful purposes of said reorganized corporation; and (9) that the proposed issue was for a lawful statutory purpose.

*Third.*—That the commission misapprehended its legal power by assuming that the Legislature intended to empower the commissioners to overrule the judgment of the board of directors and stockholders of the new corporation and the parties interested in the former corporation, and thereupon to substitute the judgment and discretion of the commission.

*Fourth.*—That the commission misapprehended its legal power in that the rules of law and procedure necessary and essential for the impartial administration of justice according to established principles and the requirements of due process of law as guaranteed by the Constitution of the State of New York and by the Constitution of the United States were arbitrarily disregarded, and in that the commissioners constituted themselves parties and adversaries of the applicants, and so conducted the proceeding as to deny the applicants a fair, impartial and unbiased hearing.

*Fifth.*—That the commission misapprehended the questions of law and fact to be determined and hence in its opinion in-

advertently misrepresented the contentions of the applicants. The applicants' theory was that the following were fair elements to be considered:

"1. That all the existing stock represented bona fide investment in cash at par actually received by the existing corporation.

"2. That there had been no diversion of earnings to pay capital at any time and no depletion or impairment of capital by withdrawals for the use and benefit of stockholders or bondholders or any one else.

"3. That the consolidated 4 per cent bonds of the Third Avenue Railroad Company were just debts of the corporation which had actually received full value for them.

"4. That the capital expenditures and the cost of the property were equal to if not in excess of the proposed capitalization.

"5. That a new corporation undertaking to reproduce the system would reasonably have to provide for an issue of securities of a par of at least \$58,000,000 in respect of the physical property alone, without regard to the cost or value of franchises and what would probably, if not necessarily, have to be expended in establishing the enterprise as a going concern.

"6. That the parties in interest were entitled to consider the amount invested in the property in determining the value of the property as a going concern and the commercial wisdom of the proposed transaction and the value to the new corporation of the property as a going concern, and that their action and judgment should not be set aside and that of the commission substituted in the absence of any proof of fraud or of any intention or purpose to deceive or impose upon the public.

"The commission may have been likewise misled by inadvertently assuming that the applicants urged that, on a readjustment of existing interests, stock and bonds should be allowed according to the present cost to reproduce all existing property in a new condition and not in its present condition, when as a matter of fact no such theory was intended to be presented or urged by the applicants. The evidence of the probable cost to reproduce the physical property, irrespective of allowance for franchises or money spent in establishing the commercial value as a going concern, established the fairness of the proposed readjustment.

*Sixth.*—That the commission erred when it stated that competent evidence did not substantiate the assertion that the Third Avenue Railway Company had spent on the corporate property and assets an amount equal to or in excess of the proposed capitalization of the new company.

*Seventh.*—That the commission erred in unwarrantably assuming the existence of prejudicial facts that the Third Avenue Railroad Company had been mismanaged by its officers and directors.

*Eighth.*—That there is no competent proof to sustain the commission (1) in stating that the applicants did not attempt to show what the entire present existing physical property had actually cost the company originally; (2) in disregarding as a part of the estimated cost of reproduction the customary 5 per cent for contingencies, incomplete inventories and unforeseen requirements; (3) in stating that no evidence had been presented to show what became of the money obtained from bonds and stock; (4) in stating that it would be exceedingly difficult to separate each company and to value its property; and (5) in stating that unusual care had been exercised in making up inventories of the property, and that the lists prepared by the companies or their receivers had been checked by a consulting engineer in charge of the appraisal and his assistants.

*Ninth.*—That the commission erred in its finding in regard to the estimated cost to reproduce new and the conclusions to be drawn therefrom as to the estimated depreciation and present value of the physical property.

*Tenth.*—That the finding of the commission when it asserts that the witness Henry Floy admitted \$10,000,000 or \$12,000,000 of depreciation as a demonstrable fact is not supported by competent proof and the evidence shows that such estimate was

of a purely theoretical depreciation, and that the actual depreciation was only \$2,699,046, and that the efficiency of the road could be restored by an expenditure of \$2,000,000.

*Eleventh.*—That the commission erred in stating that the company could have amortized a sufficient amount to have paid off the entire cost of the road for horse car lines and equipment and cable roads, and still have paid dividends of over 8 per cent and founded a reserve fund besides.

*Twelfth.*—That the commission erred in intimating that the proof showed that the applicants in the estimate of cost of reproduction and necessary and reasonable capitalization contended as follows: (1) that items of expenditures in connection with the estimated cost of reproduction could be duplicated; (2) that estimated expenses in connection with the establishment of the bankrupt company were to be allowed; and (3) that the witness Floy included interest and taxes not merely up to the time when operation would probably begin, but also until the company could earn a sufficient surplus over and above operating expenses and interest to pay a reasonable dividend to the stockholders, the fact being that said witness allowed 8½ per cent to represent 'interest on capital and bond issues, rents and so-called wages of superintendence and administration in addition to further similar expenses chargeable to construction.'

*Thirteenth.*—That the commission erred in stating that it had valued the property as a going concern, and that the appraisal was considerably larger than if this factor had been disregarded, and in stating that a further allowance had been made under this heading for the unification of the system, when the commission made no allowance whatever for such value as a going concern.

*Fourteenth.*—That the commission misapprehended the bearing of the claim of \$300,000 against the receivers of the New York City Railway and the Metropolitan Street Railway for use and occupation of the Third Avenue lines between Sept. 25, 1907, and Jan. 11, 1908.

*Fifteenth.*—That the commission misapprehended the contentions of the applicants in intimating that the applicants contended that the physical property of the Third Avenue Railway was worth \$58,125,000.

*Sixteenth.*—That the commission erred in finding that the unit prices adopted by the engineers in this proceeding were in fact higher than the contract prices actually being paid by railroads.

*Seventeenth.*—That the commission erred in accepting the appraisal of the witness E. G. Connette as competent evidence of estimated cost of reproduction, actual present value, or depreciation.

*Eighteenth.*—That the commission misapprehended the evidence that possibly the witness Floy had made an error in considering as spent about \$1,000,000 which the company had not spent but purposed to spend.

*Nineteenth.*—That the commission misapprehended the evidence in finding that the classification of expenditures made by the witness Marvyn Scudder, employed by it, was based on vouchers, when the evidence established that his classification was arbitrary and not based upon an examination of the necessary books and vouchers.

*Twentieth.*—That the commission may have been misled in assuming that the records were very incomplete and unsatisfactory.

*Twenty-first.*—That the findings of the commission in Table V of its opinion [This table relates to depreciation and present value of the property as of Sept. 1, 1909.—Eds.] are not supported by competent proof, and that there was a preponderance of proof against the existence of the facts and figures therein found:

*(a)* In that the findings under 'total cost to reproduce' are less than the cost to reproduce the property.

*(b)* In that the findings under 'scrap value' are less than the scrap value.

*(c)* In that the findings under 'wearing value' are less than the wearing value.

*(d)* In that the statements under 'obsolescence, inadequacy

and age' are greater than the obsolescence, inadequacy and age, and that such conclusions and figures are theoretical, speculative and contingent and are not based upon the existing facts, and in that there have been erroneously included allowances for speculative, anticipated progress in the arts and for supersession due to obsolescence and inadequacy which are purely theoretical and not based upon existing facts, and in that the age of the property upon which such findings and figures are based is theoretical and is not the actual life of such property.

*(e)* In that the conclusions under 'deferred maintenance' are greater than the deferred maintenance of such property.

*(f)* In that the findings under 'wear and tear' are greater than the wear and tear as established by evidence, and in that such wear and tear is an arbitrary estimate and is not based upon facts or upon the actual condition of the property.

*(g)* In that the findings under 'remaining wear' are less than the remaining wear.

*(h)* In that the findings under 'present value' are less than the present value.

*Twenty-second.*—That the statements of the commission that no deduction had been made for anticipated progress in the arts, and that the depreciation computed by the witness Connette was founded merely upon what is now in sight and not upon the theory that some new invention or discovery will revolutionize the present street railway system and render useless a large part of the property before it is worn out, are erroneous.

*Twenty-third.*—That the finding of the commission that the present value of the physical property upon Feb. 28, 1910, omitting development charges, was approximately \$31,600,000 is erroneous.

*Twenty-fourth.*—That the allowance by the commission of only \$3,500,000 for development charges is erroneous. The allowance for development charges should have been approximately \$11,500,000.

*Twenty-fifth.*—That the conclusion of the commission that the total appraised value of the physical property upon Feb. 28, 1910, including \$3,500,000 for development charges, was \$35,100,000 is erroneous.

*Twenty-sixth.*—That the estimated current assets of the Third Avenue system (Tarrytown company omitted) on Feb. 28, 1910, as stated and found by the commission, are erroneous, and there is a preponderance of proof that the said assets amounted to at least \$2,057,937.72.

*Twenty-seventh.*—That the valuation by the commission of the physical property and current assets at \$36,850,000 is erroneous.

*Twenty-eighth.*—That the conclusion of the commission that the estimated current liabilities of the Third Avenue system (Tarrytown company omitted) of Feb. 28, 1910, were \$18,710,744.34 is erroneous.

*Twenty-ninth.*—That the conclusion of the commission as to the financial results for the entire Third Avenue system, the Mamaroneck line excluded, for the fiscal year ending June 30, 1909, was erroneous.

*Thirtieth.*—That the commission misapprehended the evidence as to the amount of income which would be available for the payment of interest on bonds and dividends on the capital stock of the reorganized company, and erred in disapproving the issue of the bonds and stock upon the ground that the earnings would not be sufficient to pay the interest and dividends thereon.

*Thirty-first.*—That the estimates of gross earnings, operating expenses and net earnings of the system for the year ending June 30, 1910, contained in said opinion differ from the actual results.

*Thirty-second.*—That the estimated gross earnings, operating expenses and net earnings for the year ending June 30, 1911, contained in said opinion are erroneous and prejudicial to the applicants, and that the actual net returns of any period covered by such estimate and speculation which has elapsed greatly exceed such estimates, and that such future net earnings may reasonably be expected to be greatly in excess of the commission's said estimates."

Statements of earnings of the Third Avenue Railroad Company and subsidiary companies were filed with the application. Total transportation revenues of the system for the year ended June 30, 1910, were \$7,515,965 and total electric railroad operating revenues were \$8,648,453. Non-operating income amounted to \$27,017, making a total income of \$8,675,470. Operating expenses aggregated \$5,356,509 and rent deductions \$240,167, making a total of \$5,596,676. The resulting income was \$3,078,794, against which taxes of \$548,916 were charged, leaving gross income applicable to corporate properties of \$2,529,878. Interest deductions, not including interest on receiver's certificates, were \$618,798, leaving net corporate income of \$1,911,080. The total operating and non-operating revenue in July, 1910, was \$895,653, and in August, 1910, it was \$818,929.

The commission has referred the application for a rehearing to its counsel.

### CHEMICAL TREATMENT OF TIES USED IN THE CHICAGO TRACK REHABILITATION

The second annual report of the Board of Supervising Engineers of Chicago Traction presents an exhaustive report of the investigations made preliminary to the adoption of the chloride of zinc treatment of the ties used in the new track work. An abstract follows:

"We have learned that the treatments that have met with the greatest success and the ones that are in most general use are the following: creosoting, chloride of zinc (Burnettizing), zinc tannin (Wellhouse), creosote, zinc emulsion (Rutger) and carbolineum.

"The developments of the different combination treatments, zinc tannin, creosote, zinc emulsion, etc., are the results of information derived from the use of the plain creosote treatment and the plain chloride of zinc treatment of ties and timbers exposed to air and to variable conditions of moisture. The chloride of zinc treatment has been most commonly used in the preservation of ties in this country. It is the cheapest method and if retained in the wood in proper quantities is an effective preservative. The use of creosote has in most cases shown high results, but the cost of this treatment as compared to the straight chloride of zinc is very high. The cost of creosote treatment with about 10 lb. or more to the cubic foot is from 30 cents to 40 cents per tie, while the zinc chloride treatment ranges from 8 cents to 15 cents per tie.

"Chloride of zinc being soluble in water, it is believed that the salt is washed out of railroad ties and timbers by the action of rains and floods and the value of the preservative destroyed, thereby proportionately reducing the resistance of the timber to decay. In order to render the tie impervious to water and prevent the leaching out of the salt, the zinc tannin or Wellhouse process (chloride of zinc, glue and tannin) has been adopted, the glue and tannin combining to form an insoluble substance that plugs up the cells of the wood. The cost of the zinc tannin treatment is from 10 cents to 17 cents per tie.

"The complete impregnation of the timber to its center with preservative is essential to ensure the best results, and in the case of creosote this requires large quantities of oil, heavy pressure and long treatment, making the cost very high, 60 cents to 70 cents per tie, while chloride of zinc is easily and quickly carried to all parts of the timber with proper treatment. A combination of the two preservatives is now being used in the treatment of ties known as the 'Rutger' or 'emulsion' treatment, which results in an impregnation of chloride of zinc to the center of the tie and a partial impregnation with creosote, the result being that the interior of the stick is preserved by the chloride of zinc and the exterior has the benefit of the creosote as a preservative and to make it waterproof. The Chanute timber preserving plant at Paris, Ill., is at present engaged upon a chloride creosote or 'Rutger' treatment at a cost of 23 cents each.

"The carbolineum treatment of timber is being pushed by the Carbolineum Wood Preserving Company. The antiseptic material is a patented compound made in Germany and known

as 'Avenarius Carbolineum.' The treatment advocated is 'dipping' and costs about 25 cents per tie, this cost information being given by the wood preserving company's Chicago representative, A. H. Sauerbier. He quotes a price of 60 cents per gallon for the compound and says that in the dipping treatment each tie takes up about one-third of a gallon, equaling 20 cents for material, and he adds 5 cents for labor, making a total of 25 cents per tie. The dipping treatment cannot possibly permit a complete penetration of the tie, and the small amount of compound taken up would indicate that this treatment is a surface treatment only and that the interior of the stick would not be protected against dry rot.

"It is conceded that the life of timber is greatly increased where there is no variation in the amount of moisture it contains and where it is protected from evaporation and alternating wet and dry conditions. In our substructure the ties will be protected when entirely encased in concrete, which will act as a great factor in extending the life of our tie timber beyond the life ordinarily experienced in open-track construction, where the ties are subjected to alternate varying conditions of wet and dry. We can expect, therefore, a much longer life to our ties. The information we have at hand as to the pine tie taken from the tracks of the Twin City Lines in St. Paul, Minn., after a service of 15 years, 3 years of which the tie was embedded in a sandy soil and 12 years on a sandy foundation with the sides and top encased in concrete (similar to our type 3 construction), and which tie seems to be in a perfectly sound condition, would seem to indicate that the original position taken by the board upon this subject, that a wooden tie encased in concrete would be preserved against decay, was, in the light of existing information, a tenable position. Timber absolutely free from fungus or fermentation at the time it was placed in the concrete would probably be preserved against decay. It is not so probable, however, that ties in which fungus has started or a state of fermentation exists at the time of placing them in the work will be preserved against decay, and, as it is a physical impossibility to inspect each tie to the extent of determining whether or not it is perfectly free from infection, it would seem that an antiseptic treatment of the ties would be a desirable precaution.

"Inasmuch as our ties are encased in concrete and thereby protected from the action of water there would be no tendency for the soluble salts to leach out and it would seem that the straight zinc chloride treatment would be all-sufficient for our requirements. Our present specifications call for long-leaf yellow pine 90 per cent heart. By using treated ties sap timber can be accepted, greatly increasing the scope of our market and reducing the cost of our timber. In considering suitable timber for treating, the permeability of the wood or its ease of accepting treatment must be considered. The financial part of the question may be summed up as follows:

The present price of our ties is on the basis of \$27 per 1000 ft. b.m., or.....	75.6 cents each
New price of timber, \$24 per 1000 ft. or.....	67.2 cents each
Add to zinc chloride treatment.....	15. " "
	82.2 " "
Cost per mile of tie, type 2 construction, present.....	\$997.92
Cost per mile of tie, type 2 construction, treated.....	1,085.04
Additional cost per mile for treated ties.....	87.12
Total cost of track at present, \$36,500 per mile, which makes added cost for treated ties 1/4 of 1 per cent.	
Total cost of substructure, type 2 track.....	\$11,500.00

"Inasmuch as we are not in possession of exact information as to length of life, we will assume 20 years' life for the substructure. Upon this basis annual depreciation would equal \$575; depreciation per month, \$48. Based on the theory that the renewal of the ties would mean the renewal of the entire substructure, an increased life of two months would pay for the extra cost due to treatment. Based upon the theory that the renewal of ties would mean a 50 per cent renewal of the entire substructure, then four months' added life would pay for the treatment. This depreciation and consequent saving does not include \$25,000 represented by the cost of the superstructure, but the assumption is made that the substructure renewal would be made at a time when a renewal of rails would be necessary. In case rebuilding of the track was made necessary by the

condition of the substructure only, then an increased depreciation must be figured and a corresponding advantage given to the increased life.

"It would seem from the above that it would be advisable to adopt the zinc chloride treatment for our ties."

John Z. Murphy, chief engineer, Chicago Railways Company, and a member of the Board of Supervising Engineers, submitted the following table of costs for treating ties, which had been obtained by one of his assistants:

Method.	Cost per Tie, cts.	Est. Yrs. of Life	Est. Inc. of Life for Tie.
Burnettizing, zinc chloride.....	11	10-12	6-8
Wellhouse, zinc chloride, tannin and glue....	14	10-12	6-8
Rueping, creosote.....	15-18	12-15	8-11
Lowry, creosote.....	20-25	12-15	8-11
Rutger, zinc chloride and creosote.....	15-18	12-15	8-11
Allardye, zinc chloride and creosote.....	15-18	12-15	8-11
Card, zinc chloride and creosote.....	15-18	12-15	8-11
Haskin.....	3-6	12-15	8-11

A discussion on the value of different chemical treatments for cross ties was submitted by Octave Chanute, past-president of the American Society of Civil Engineers. Mr. Chanute is quoted as follows:

"It was demonstrated that over 5,000,000 hemlock and tamarack ties treated by the writer for the Chicago, Rock Island & Pacific Railway averaged a life of 10 $\frac{3}{4}$  years in the tracks east of the Missouri River and 11 $\frac{3}{4}$  years west of that river, the latter in consequence of the lesser rainfall. These ties were mostly treated by the original two-injection zinc-tannin process, which was changed in 1895 to the three-injection process.

"Until the system of tie fastening is thoroughly reformed in this country and the barbaric spikes abandoned, it seems probable that the life of ties will be limited by mechanical wear, and that from this point of view the zinc-creosote process will be a good one to use. This has been introduced at the Paris (Ill.) plant, with which the writer is connected, and after a year's experimenting success has been achieved in thoroughly overcoming the only defect found in that process, i. e., the possible separation of the oil from the watery solution of chloride of zinc during the period of pressure required to inject the desired quantity."

It was Mr. Chanute's opinion that the best treatment is creosote, provided enough of it is used, but after being shown the board's plans for encasing the ties in concrete he recommended that the chloride of zinc treatment be used, inasmuch as the ties were not to be exposed to the weather. When zinc-chloride-treated ties are encased in concrete practically all possibility of decay from fungus will have been eliminated, if the tie is given an opportunity to dry for some weeks in the air so that the water of the solution is evaporated, leaving nothing but the antiseptic, which is chloride of zinc. In five or six weeks, under ordinary conditions, ties would lose seven-eighths of the water. The practice in France is to inject 60 lb. of creosote to the tie. The board states that in America the usual practice is to use about 20 lb., the cost of the treating substance being considered almost prohibitive to be used in large quantities.

In bringing out the importance of the exclusion of air in the preservation of timber, Trajan's bridge across the Danube River, where piles have been found in good condition after 1400 years, was cited, the good condition after many centuries being due largely to the exclusion of air.

## NEW SOUTH WALES REPORT

The report of T. R. Johnson, chief commissioner for railways and tramways of New South Wales, covering the year ended June 30, 1910, shows total tramway earnings of £1,185,568 as compared with £1,097,565 in the previous year, or an increase of 8 per cent. Expenditures were £983,587, or 82.96 per cent of earnings, as compared with £875,560, or 79.77 per cent, in the preceding year. During the year 201,151,021 passengers were carried without loss of life to passengers from any tram accident. The number of miles of line operated at the close of the year was 165.75.

## PROTECTION OF METAL EQUIPMENT\*

BY WILLIAM MARSHALL

When this topic was assigned to the writer he realized it was altogether too great for any one man to handle properly. Hence he put himself in communication with men whose experience in painting, in both the building and repairing of metal cars, made them the best fitted to speak intelligently. Consequently, this is a composite paper, embodying the views of the men who have had to meet a condition that demanded their best thought. The writer formulated eight questions that if answered might impart most of the information required on the subject of "Protection of Metal Equipment." The questions and answers follow, together with some comments.

*Question No. 1.—The difference and difficulties encountered as between wood and metal.*

All answers call attention to the fact that wood is porous and metal only partially so. From the standpoint of difficulty some favor wood, because it comes to the paint shop from the hands of the wood worker ready to receive the priming coat, and no preparatory work has to be done. One advocates a treatment of the plates before assembling, so that there may be no opportunity for rust, which forms so quickly while the car is being built. Nearly all recognize the necessity for sand-blasting all parts before anything is applied; some advocate pickling to remove all scale and flash. One man calls attention to the importance of looking out for parts unseen, thus: All lap joints where metal is placed against metal or metal against wood should be thoroughly painted with a red-lead lute before being riveted together. The material used should be as heavy as possible and be applied with a brush. All hidden metal parts not to be surfaced and varnished should be given not less than two or three coats of the best protective paint obtainable, and suitable time allowed between coats for drying.

A second one remarks: Use different mixture for priming coat, on account of difference in absorption; less number of paint and varnish coats required on account of the improvement in the manufacture of steel sheets in being nearer to a perfect surface, fewer paint and varnish coats required consequently increasing average life of painting.

A third one states: The metal should be thoroughly sand-blasted to remove all scale and rust, and then primed with a material adapted for metal work. This treatment should be followed in the same manner as for wood cars. In rubbing the surfacer down to a smooth and level surface use emery cloth and oil, instead of pumice and water.

It is evident from all replies that the life and appearance of the car will depend upon the care taken in thoroughly sand-blasting to secure a uniformly smooth surface. No time must be lost between the sand-blasting and application of the initial or priming coat, as the natural moisture in the air rapidly condenses on the new bright surface and will soon form rust.

*Question No. 2.—What do you consider the best treatment from foundation to last varnish coat?*

(A) The primer coat should be applied, and when dry, all imperfections should be puttied up and time allowed for drying and hardening. Next operation, sandpaper and dust lightly, and to all flat surfaces apply one coat of glazing or knifing putty. This should fill the surface to such an extent that three coats of rough stuff should form body to rub to a smooth, level surface. When perfectly dry this surface should be carefully sandpapered with No. 00 emery cloth, well dusted off, and the surface given two or more coats of body color. When dry, ornament and allow 24 hours to dry. Then apply first coat of varnish, medium drying. When dry, apply second coat with more left on to give a perfect flow. This coat should have three days to harden, when it should be lightly rubbed with pumice pads, rinsed and dried off thoroughly. After which apply the third coat of a slower drying car body finishing varnish, and leave to harden.

\* Abstract of paper presented before the New York Railroad Club, Oct. 21, 1910.



(B) First day.—One coat primer; should have little oil and should be well brushed out.

Second day.—One coat No. 2 surfacer.

Third day.—One coat No. 3 surfacer.

Fourth day.—One coat No. 3 surfacer.

Fifth day.—One coat No. 3 surfacer.

Sixth day.—Car to be rubbed smooth with a rubbing brick and water or emery paper block, one-half raw linseed oil and one-half benzine.

Seventh day.—After it is thoroughly dry, give two coats of flat color; one coat morning and one coat in afternoon.

Eighth day.—Car to be striped and lettered.

Ninth day.—Car to be first coated with a good finishing varnish.

Tenth day.—First varnish coat drying; 48 hours.

Eleventh day.—First varnish coat drying; 48 hours.

Twelfth day.—Second coat good finishing varnish.

Thirteenth day.—Second coat drying; 48 hours.

Fourteenth day.—Second coat drying; 48 hours.

Fifteenth day.—Third varnish coat applied.

Sixteenth day.—Third coat drying; 48 hours.

Seventeenth day.—Third coat drying; 48 hours.

Eighteenth day.—Car ready to turn out.

(C) After the usual surfacing materials have been applied use an elastic coat of color, one coat of enamel, and at least two coats of finishing varnish.

(D) . . . After above process (preparation of metal).

Allow priming coat to dry, 24 hours.....first day.

Then putty all depressions, and knife in surface one or two coats, as conditions may require (if two coats of latter) .....second and third days.

Then apply one or two coats of rough stuff (according to condition of surface).

When dry, rub with block pumice stone and water. Sandpaper with No. 0 sandpaper, and apply...fourth and fifth days.

One coat varnish.....sixth day.

One coat varnish.....seventh day.

One coat varnish.....eighth day.

Say three days for drying third coat.....

.....ninth, tenth and eleventh days.

(E) The difficulties encountered are in securing large metal plates free from buckles and other defects. When varnish is applied to plates containing the slightest buckles they are magnified to such an extent as to resemble mountains. These buckles do not interfere with the durability of the painting, only detracting from the beauty of finish.

(F) We favor any of the well-known paint surfacers with primer manipulated to suit the steel, with the minimum number of surfacer and enamel body color coats, and to include not more than two coats of body varnish for finishing.

Others agree in saying that there should be no material difference between treating a metal and treating wood, except that the priming coat should have less oil, on account of the smaller porosity of metal.

As to question No. 2, A's process would take about 17 days, B's 18 days, and D's 11 or 12 days. It will be noticed that D does not recommend puttying and glazing coat, but in place thereof uses three coats of No. 3 surfacer. The objective point in the use of all surfacers (called rough stuff) is to obtain an absolutely level and smooth surface before the color coats are applied, contributing not only to the appearance of the car, but aiding largely in holding up evenly the color and varnish coats. If such a surface was not secured it would be wavy, dimply and nibby, causing the paint and varnish to be broken off during the terminal mopping or regular cleaning. As to the relative merits of the "glazing or knifing putty coats" applied over the primer, in place of rough stuff, no reasons are given, but they are evidently used to reduce the number of rough-stuff coats.

Question No. 3.—In the few years metal cars have been in service what has been your observation in regard to their appearance and durability in comparison with wood?

(A) We have on our line over 200 steel passenger cars,

which have been in service over four years. As far as the general surface is concerned, I see no material difference between them and our wooden passenger cars. One has the appearance of being equally durable with the other. Upon examination, however, we find that wherever there is the slightest opening of the joints moisture creeps in, causing corrosion. Time alone can determine how long a time would elapse before this corrosion would eat into the framework so as to cause weakening of the whole structure.

(B) Metal cars will undoubtedly be more durable than wooden cars. The metal freight car has proved its superiority over the old wooden cars, and, no doubt, the metal passenger car will do the same. We are not accustomed to the plain appearance of the inside of metal cars, but we shall get used to them and they will look all right. Besides being plainer, they are much more sanitary.

(C) This all depends upon what care has been taken in the preparation of and in painting the steel sheets. We have seen wooden cars fail in three years, more from careless work than from poor material; on the other hand, we have had steel passenger equipment under observation for five years and consider the cars in good condition. There is no question that painting on a wooden car will have a longer average life than on a steel car. The latter has the disintegration which starts from the time the car or steel sheets leave the sand-blast house and continues until it becomes necessary to remove and repaint that particular sheet, which usually is when it reaches the age of five and one-half years to six years. There is no primer of any of the surfacing systems on the market to-day that will prevent this deterioration.

The answers to question No. 3 are apparently in favor of metal. Several correspondents remarked on the appearance of a metal car because of rivets, laps, etc. The best the writer has seen are some of the more recent Pullman cars. The entire side, under the windows, is pressed up or molded to resemble the wooden battens. The under row of rivets is not seen, being placed under the car and fastened to a rigid strip of angle iron; the upper row of rivets is so close up under the windows as scarcely to be noticed; but the interior does not present the same elegance and taste that are given by the beautiful and artistic finish of the wooden cars.

Question No. 4.—Do metal cars clean at terminals as well as wood?

(A) Metal cars clean up a little harder than wood.

(B) . . . The inconvenience encountered with rivets is probably counterbalanced by the numerous beads of most wooden cars.

(C) I find no great difference in cleaning metal cars at terminals as compared with wood.

(D) Metal cars will in our judgment clean at terminals as well as wood.

The answers to question No. 4 vary a little. Terminal cleaning does not generally come under the supervision of the master painter, but the one in charge of that department should be one who has a practical knowledge of what is injurious to varnish and paint. Much harm can be done, great expense involved, and blame be put on the varnish and general work of the paint department by the use of strong solutions used to save elbow grease. Anything that is strong enough to remove dirt easily will be strong enough to remove a portion of the varnish film each time it is applied. Cleaning solutions of medium strength may be used when quickly applied and quickly rinsed off with clean cold water, but this requires both skill and expedition. A cleaner that is not soluble in water and cannot be rinsed off will embed itself in all interstices and gradually eat the varnish and paint away, and do it more thoroughly and quickly than surface exposure to rain and sunshine, heat and cold, or sulphuric acid gases encountered in tunnels.

Question No. 5.—On returning steel cars to the shop do you find problems in touching up, repairing and revarnishing different from those of the wooden car?

(A) The touching up, cutting in and revarnishing the ex-

terior is about the same with steel as with wood cars. With the interior parts there is a difference, as the natural wood must be scraped and refinished where it has been bruised, while the steel car can be forced up with putty and repainted.

(B) There are problems presented by the steel car that do not exist on the wooden car. For instance, take the button or rivet heads. In every case it was found that the varnish and paint had been worn off, exposing the metal. This also applies to the edges of metal plates. In my opinion this was due to repeated terminal cleaning; a really unavoidable result of a necessary practice. In a number of cases these exposed parts had begun to rust. These hundreds of rivets must be freed of this rust and carefully repainted before the car is cut in. The flat surface of a car may be in such condition as to require only a coat of varnish, but the touching up of these innumerable rivets with a color so difficult to match as . . . . . would produce an effect at once objectionable, and cutting in the entire car would be the only course to pursue. In other words, a steel car, on account of its construction, cannot receive the same treatment as a wooden car.

(C) In touching up and revarnishing metal cars we find many joints to be corroded, which must be scraped and cleaned down to the bright metal, then primed and resurfaced the same as new.

(D) We advocate cutting sheets in preferably to touching up. If a sheet is scarred it is better to clean the whole sheet with one of the paint solvents than to touch up, though the tendency on wood cars is to putty and touch up.

*Question No. 6.—Does your present experience or does your opinion, based on present experience, lead you to believe that there will be any greater trouble in future years in making repairs to metal cars by reason of side-wipes, collisions and wrecks?*

(A) It is conceded the metal car will withstand the greater impact in case of wrecks, rakes or severe side-wipes. What would merely rake the painted surface material down to the metal would most likely cut through the sheathing on the wooden car, causing renewal. Accidents which break in the end or side, or perhaps break the wooden car in two, would be likely to merely bend the metal so it could be repaired and got into service in shorter time. There are, however, instances where it would be out of the question to repair either class of cars, but where it would be much cheaper in the end to build entirely new than to attempt to cut apart, straighten out and reassemble the metal cars. Metal heated and worked over is not of the same nature or strength as in its original state. The metal is of some value as scrap, which is a gain over the wooden car.

(B) The corrosion in the joints, in my opinion, will eventually weaken the whole structure and cause extensive repairs to be made. If the car is side-wiped or wrecked the cost of repairs to metal cars would be much more expensive than with wooden ones.

(C) We have had several collisions and wrecks wherein metal and wood cars were concerned, and in almost every instance where the force of the collision was sufficient to make an indentation in the metal car the wood car was a wreck or damaged to such an extent as to make repairs harder and more expensive.

The consensus of opinion is that because a car is steel it will offer a greater resistance in accidents and so reduce to the minimum the number of times it will require repairing.

*Question No. 7.—You know the average life of a wooden car; do you think the metal car will last as long?*

(A) I think the metal car, if properly taken care of, will outwear the wooden car, but it is my opinion that if the cars are allowed to deteriorate on account of non-shopping at necessary intervals their appearance will show more markedly the neglect of proper care than the wooden car.

(B) It is rather early to tell the exact life, but one can safely say it will last one-third longer. A steel car well built and painted from the foundation up should last from 10 to 20 years. Practical experience teaches that paint is the life of a steel car.

(C) In my opinion the steel car equally well protected with the wooden car will outlast the latter.

(D) If the steel car structurally withstands the continuous vibrations, also probable rivet-shearing motion to which the fast traveling passenger car is subjected, I cannot see why it should not last longer than the wooden car.

(E) We have wooden cars on our line still in good condition which have been in service 30 years.

*Question No. 8.—From an economical standpoint is it your opinion that although the cost of a steel car is greater in the beginning it will nevertheless compensate for the increased first cost by the longer service it will give?*

(A) Yes, if the present substantial make of steel passenger car is put in proper general repair at timely periods, not abused because it is made of steel, kept in the best paint and varnish repairs, also allowed to live out its service life without being subject to the usual architectural changes made in passenger equipment.

(B) I do not think the increased cost of a steel passenger car will be compensated for by any longer service.

(C) If the design is good and construction stable, the steel car, if well protected, ought to be more economical in the long run.

(D) It is a question if the increased cost of steel equipment will compensate for the increased first cost by any longer service it will give, though when the additional element of safety it will give over the wooden car is considered, I should say the increased cost is warranted.

Naturally on so new and so great a subject there must be some difference of opinion, both in regard to practice and result, but the preponderance of views points to the practicability of properly protecting metal equipment and of maintaining it in the years to come. Too much emphasis cannot be put upon the importance of thoroughly coating the concealed parts, so that moisture and the destructive elements of the air may be excluded. Whatever may be discovered, it is a fixed principle that it is the action of the air and moisture that causes rust and decay. The demolition of some of the earlier built metal and concrete buildings has demonstrated that where the iron was perfectly embedded in concrete or cement no change has taken place.

## STREET RAILWAY CAPITALIZATION

Charles S. Mellen, president of the New York, New Haven & Hartford Railroad, in a letter addressed recently to officers of the Connecticut Editorial Association in relation to proposed public utilities legislation in Connecticut, refers incidentally to street railway capitalization. Upon this point Mr. Mellen says:

"The most important of the specific questions which you put to me is, in substance, whether the capitalization of a street railway company is of any importance to the public. My answer is, Yes, but not in the way many people seem to suppose. The mere amount of a company's capital bears no relation to the actual or possible gross or net earnings of the company, or to the rates charged or the service afforded.

"No street railway manager earns from his business more or less because of differences in the amount of his company's capital. If he is worth his salt, he always earns (whatever be the amount of his company's capital stock) all that he can; but the best way for him to do this is to give the public the best possible service at rates sufficiently low to create the largest possible volume of remunerative business.

"A careful comparison seems to show that under similar conditions public service corporations of Connecticut in general give at least as good service at rates as low as do like corporations of Massachusetts, whose capital has been stringently restricted. I may say, moreover, from an experience in a good many States, that the street railway service of Connecticut with all its faults is on the whole at least as good, with rates at least as low, as in any of such other States."

## END OF THE COLUMBUS STRIKE

As stated in the *ELECTRIC RAILWAY JOURNAL* of Oct. 22, 1910, the strike of the employees of the Columbus Railway & Light Company, Columbus, Ohio, has been declared off. The action by the men declaring the strike at an end was taken at a meeting held on Oct. 18, 1910, at 9:30 p. m., and the strike was terminated so far as the men were concerned 12 weeks and three days after it had been declared. All told, about 450 men quit their places with the company on July 24, 1910, when the strike was declared.

The company has announced no change in its decision regarding the re-employment of the men who went on strike. The company has been willing at all times to take back such men as were acceptable to it and place them on the extra list in the order in which they filed applications. The men that the company re-employs will not lose any time credit that they may have earned before going on strike and they will receive pay at the same rate paid prior to the strike. All of the regular runs, however, have been filled by new men, and only extra runs are left for the men who went on strike. In many cases the old men have accepted these conditions.

The resolution adopted by the union declaring the strike off follows:

"Whereas, Division No. 538 of the Amalgamated Association of Street & Electric Railway Employees of America has been unable to arrive at a satisfactory settlement or come to any agreement that was fair to the men with the Columbus Railway & Light Company in the controversy which brought on the present street car strike; and

"Whereas, The striking street car men are of the opinion still, and remain unchanged in their belief, that their cause was and is a most just one and that they ought and ultimately would win, except that winter with its attendant hardships is fast coming on; and

"Whereas, In view of the approach of the inclement season, a further prolongation of the strike of this union against the Columbus Railway & Light Company will entail suffering, embarrassment and loss upon loyal friends,

"Therefore be it resolved: First, that the strike of Division No. 538 of the Amalgamated Association of Street & Electric Railway Employees of America against the Columbus Railway & Light Company be and the same hereby is declared terminated and ended.

"Second, that the thanks of this union are due and are hereby extended to our many loyal supporters, friends and sympathizers among the general public, and most especially are we grateful to organized labor of the city, State and nation for its moral and financial support in the recent struggle."

The funds which the employees of the company had accumulated by dues and other means in the treasury of their organization have all been dissipated in the effort of the men to enforce their demands on the company, as have also \$20,000 contributed by the parent organization and donations by sympathizers in other lines of work. Sympathizers with the strikers had already subscribed for stock in an automobile omnibus line to compete with the cars of the company, and action will now have to be taken in regard to the future of this company. It is expected that the subscriptions will be returned after the expenses so far involved by the bus company have been pro-rated among those who subscribed to the company.

According to the *Columbus Citizen* the cost of the strike to the city and the State was \$215,300. The *Citizen* has tabulated the cost as follows: "Total cost to the State of Ohio of the disorder incident to the strike, \$178,000. This includes: Pay for troops, \$12,000; feeding the troops, \$20,000; transporting the troops, \$28,000; incidentals, \$10,000; disorder in Columbus approximately \$37,300, as follows: Police autos, \$17,000; special police, \$18,000; feeding special and regular police, \$2,300."

At the expense of a member of the City Council of Columbus and several business men an accountant is investigating the books of the city to ascertain whether it is true that employees of the city purchased second-hand automobiles and rented them

to the city during the strike for more than the machines cost. An attempt will also be made to ascertain whether patrolmen used machines rented by the city for pleasure rides and whether machines were rented and paid for when not needed. Mayor Marshall and Director of Public Safety McCune state that they will aid in the investigation. Mr. McCune has been asked to furnish to the City Council an itemized statement of the expenses of the strike to the city at an early date.

On account of the necessity for taking up other cases, the men indicted for participation in the riots were not called to trial during the week commencing Oct. 16, 1910. Lawrence Riehl, however, was found guilty of violating the manifesto issued by the Mayor against open saloons for a certain period during what was then believed to be the worst of the rioting. A new trial has been asked, as the prosecution of 64 other owners of saloons on the same charge will depend upon the final outcome of this case.

## FURTHER DISCUSSION ON PROPOSED TRI-BOROUGH SUBWAY

George Gibbs, chief engineer of electric traction, Pennsylvania Tunnel & Terminal Company, contributed a communication after adjournment of the meeting at the United Engineering Societies Building on Oct. 17, reported in the last issue of this paper. Mr. Gibbs lays stress on the importance of supplying adequate local transit facilities to the new Pennsylvania station to accommodate the 100,000 to 200,000 people who, he says, will daily arrive at or depart from this terminal. He considers the suggestions of Mr. Sprague deserving of very careful consideration, but believes the most important thing at present is that the city should not make a false step by committing itself to construct with its own money, or even by authorizing others to construct with their own money, an independent road which cannot be merged with the present one, which parallels the present one for an important part of its distance, and which, by diversion of traffic, would indefinitely postpone the completion of the present subway system in its logical extensions.

Mr. Sprague has replied to the contention of Mr. Willcox that the criticism of the engineers on the tri-borough subway should have been made earlier or later. Mr. Sprague says that the route of the proposed tri-borough has been condemned by all traffic experts not in the employ of the commission, but that it was impossible to criticize the engineering plans because they were not made public until Sept. 1. He further states that the meeting was not planned to give expression to one-sided criticism. Invitations to attend the meeting had been sent to the Mayor, the chairman of the commission, the Chamber of Commerce and other bodies in ample time to be represented, but no representatives of any city department, or of the commission, or of any urban railroad company participated in the discussion. Mr. Sprague repeated his prophecy that the private construction and operation of the proposed tri-borough system meant financial disaster and a receivership or the assumption by the city of an operative deficit beside which that of the municipal ferries would be a bagatelle.

A hearing was given by the Massachusetts Railroad Commission on Oct. 18 upon the petition of the Selectmen of Abington for a 5-cent fare from all parts of the town to Brockton, on the lines of the Old Colony Street Railway. Bentley W. Warren, counsel for the company, stated that the issue was simple, and that if the fare was reduced as desired it would result in earnings of less than 1 cent per passenger mile on the branch of the system in question. A 5-cent fare is already in force for the 5 miles of track between Abington Center and Brockton, and a similar fare is in force between Whitman and Brockton. Mr. Warren said that if the fare should be cut as desired the residents of parts of Whitman would be discriminated against. He said that the present 7-cent workingman's ticket from points in Abington to Brockton, with transfer privilege at no additional cost in Brockton, answered all the needs of the situation.

## DECISION IN THE PEORIA WATER CASE

An important decision in the long-drawn-out case of the Peoria Water Works Company vs. the Peoria Railway Company (now a part of the Illinois Traction system) was decided Sept. 20 by Judge A. L. Sanborn, of the United States Circuit Court for the Northern District of Illinois. It was practically a victory for the railway company. This case has frequently been referred to in the pages of this journal during the last 10 years. The testimony on the subject was taken by Frank L. Wean, special master in chancery, who made two reports on the subject. An extended report of the evidence in the hearing during the first reference to Mr. Wean was published on page 390 of the *STREET RAILWAY JOURNAL* for June, 1899. Mr. Wean's report in full to the judges of the court was published on page 722 of the *STREET RAILWAY JOURNAL* for June 22, 1901, and stated that as the defendant could prevent the injury to the pipes of the water company through the installation of a double overhead trolley system an injunction should be issued against the operation of the system as it was then being operated.

The highly technical features of the case and the importance of the interests involved led to a re-reference after considerable delay, and on Oct. 25, 1907, the case was recommitted to the same master, who was directed to hear further evidence and also to report particularly upon the remedies which could be applied substantially to minimize or prevent the injury, if any, complained of; the relative merits of the single and double overhead trolley system; the means then employed to prevent injury to the water pipes; the extent, if any, to which the mains had been injured since the close of the proofs of the original case; and the improvements, if any, which had been made by the defendant since the close of the defendant's evidence.

Evidence in connection with this second reference was taken in March and April, 1908, and the report of the master, which was submitted in June, 1909, was published on page 43 of the *ELECTRIC RAILWAY JOURNAL* for July 3, 1909. Briefly, it stated that the evidence offered on the re-reference failed to disclose any sufficient ground for changing the previous conclusions complained of.

### JUDGE SANBORN'S DECISION

In his decision Judge Sanborn quotes the conclusions of Mr. Wean in the two references and then defines some of the terms used by the expert witnesses, such as the "C. G. S. system," "potential," "volt" and "electrolysis."

He then summarizes the claims of the complainant, which were, briefly, that its water mains and service pipes were being used as part of the negative return system of the railway company, inducing electrolysis or chemical decomposition to the mains and pipes. This took place largely at the joints of the pipes, where the current passed through the wet earth around the joints, and also at other places on the pipes where the current left them to pass to other underground structures or back to the railroad track, and also on the lead service pipes of the complainant. It was further claimed that the smallest fraction of a volt difference in pressure or potential on the pipes would cause their gradual decomposition and destruction. Finally, it was claimed that the complainant could do nothing to lessen the injury, while the defendant, by putting in an insulated metallic circuit by means of a double trolley or otherwise, could entirely prevent the damage.

The defendant claimed briefly that, by ordinance, it was required to operate by the single trolley system and that it had done everything possible for the safe return of the current in the present state of the art. Its acts were authorized by legislative authority and if any incidental injury had been done to the water system, it was *damnum absque injuria*. If there had been any serious injury, the remedy called for the exercise of the police power to be authorized only by the Legislature or the city council, and not by the court. It was also contended that the operation of street railways by electricity was practically in its infancy. Injury by electrolysis was not clearly understood in the present stage of scientific knowledge and experts were changing their views in respect to the danger of

injury. Some 1600 single trolley systems were in operation in the United States and only one or two double trolley systems. The injury in Peoria was not done generally to the whole pipe system but was localized to the region near the power station and was continually growing less and less by better methods of negative return. There was not such great or irreparable injury as to justify the installation of a double trolley or other insulated system. Moreover, the double trolley system was unreasonably expensive, its use was dangerous and it would not entirely prevent the escape of electric current into the ground and upon the water pipes so as to cause injury.

### LEGAL REMEDIES AVAILABLE

Judge Sanborn then made clear that the court had no power to prescribe by an injunction the use of any particular system of circuit or negative return. The utmost possible relief was to restrain the defendant from continuing the injury, assuming, as a premise, that sufficient damage had been shown, and to punish it and its officers for contempt in case of disobedience, leaving the means of curing the injury entirely to its discretion. The whole duty of the defendant was to make the damage as little as possible by using the best means reasonable within its power.

The judge then described what constituted an electrical circuit and summed up the testimony and declared his conclusions as follows:

### TECHNICAL PRINCIPLES INVOLVED

"It is indeed stated by some of the expert witnesses that wherever the current leaves a pipe electrolysis occurs, stripping off small particles of the pipe metal and gradually destroying it in direct proportion to the amperage or volume of current flowing on the pipe. But under all the testimony and from common observation it is clear that the mere passage of electricity from one substance to another is not electrolysis, the metals being conductors, without decomposition, and is not necessarily attended with injury at the point of escape. Mr. Waterman, an experienced electrical and railway engineer, testified that the water around a pipe will carry electricity either conductively, without damage or decomposition, or electrolytically, with injury to the pipe and decomposition of the solution; also that there may be electrolysis of the solution without injury to the pipe. Prof. D. C. Jackson, who has made a thorough study of the practical side of electrolysis to water mains for many years, and is a most accomplished electrical engineer, says that if the anode is crude copper, containing also iron and silver, only the copper may be carried to the cathode, while the iron and silver may go to the bottom of the tank. This illustrates the position sustained by the evidence as a whole, that electrolysis is a question of surrounding conditions and that current leaving a pipe may or may not be attended with injury to the pipe. Prof. Jackson's experiments tend to show that cast-iron and lead plates embedded in moist earth will suffer electrolysis when a current is applied. But he did not cover the plates with silica asphalt or other insulator, nor does he state current volume or voltage. He did not make any test with pieces of pipe covered with iron rust, which is an insulating protector. It is inferable from the evidence as a whole that wet earth surrounding a water pipe may, by containing some solution not described, possibly iron, iron rust, common salt, sulphate of zinc, nitrate of soda or carbonate of lime, become an electrolyte, decomposable by having an electric current pass through it; and also, under some conditions not described and apparently unknown, particles of the iron pipe, or anode, may be stripped off and pass into the electrolyte solution, or possibly be carried over to some unknown cathode, as in the process of silver plating. Analysis of samples of soil taken from two places above a water main showed from 2½ per cent to 3½ per cent of iron, and ½ per cent to 1 per cent of soluble salts composed of sodium chloride, potassium nitrate, lime and a small amount of sulphates. The testimony shows that 1 amp constantly leaving a pipe for 18 hours a day under electrolytic conditions will take away 15 lb. of iron per annum. Yet in 8½ years not a single break in a water main occurred, although

the rails were at that time very poorly bonded. Prof. Jackson during this period found a volume of 75 amp on some of the water mains.

#### DAMAGE DECREASING

"Injury to the ends of water pipes, near the joint, may also result from the current flowing from one pipe to another. The pieces of pipe are 12 ft. long and are covered with a non-conducting coating. It is not convenient so to join the pipe sections as to obtain a complete metallic contact between them, on account of the coating, and the oakum and lead used in the joints. Oakum is not a good conductor, and the lead, while a good conductor, is not put into electrical contact with the cast iron of the pipe, though preventing leakage of water. As a result there is a break in the conductivity of the pipe every 12 ft. However, the joint resistance is very much less than the soil resistance around the main, as well as of the water in it, pure water being nearly a non-conductor, although absolutely pure water has probably never been produced. It follows, therefore, that the current will take the path of least resistance through the joints, rather than the path of much higher resistance around them, unless an electrolyte is found near the joint, or in the water in the pipes, of such a character as to divert the current from its natural path. Complainant's witness Maury, speaking of a volume of 50 amp to 100 amp, says: 'If it left the pipe to flow along the conductor connection to the pipe it would not necessarily injure the pipe at the point of leaving. If it left to flow through the electrolyte it would cause very serious injury.' Another witness testifies: 'It is generally accepted that the current has to leave the pipe by a non-conductor path to produce injury.' Another, speaking of electrolysis, says: 'There must be an electrolyte. If the pipe was in dry, sandy soil conditions would be entirely different.' When this shunting will occur, or how often, no one knows. Many of the witnesses say that the joint resistance becomes so great that the current will shunt around the joint through the outside earth, or the water in the pipe, and that when it leaves the pipe it causes injury. It appears that most of the joints must make a high resistance. If the current were shunted around these joints, and invariably resulted in injury to the pipe, it would not take long to destroy the whole water system. In many years there was not a single break in a water main from electrolysis. During the same period only 88 out of 5000 service pipes were destroyed by it. Out of 9000 service pipes there were 12 breaks in 1905, 8 in 1906, 5 in 1907, and 2 in the first four months of 1908. During the same four months there were 2 joint leaks, 4 in 1907, 12 in 1906, 7 in 1905, 9 in 1904 and 14 in 1903. As a result of three tests at different places of a large number of pipes made in 1903, 1904 and 1906, the percentage of pipe damage in 1903 was found to be 20, 15 in 1904 and 10 in 1906. The same tests showed the average current on the pipes in 1903 to be 5½ amp, 4 amp in 1904, 6 amp in 1906, and a test in 1908 showed an average of 24 amp. These tests were by no means universal in the system and should not be given any undue weight. But they tend to show a progressively lessening average damage. In particular places, especially near the power station, steadily increasing damage by electrolysis appears, but on the average the evidence shows it is lessening. One reason for improvement is better bonding of rails and more attention to negative return feeders. Another seems to be that as electrolysis proceeds and the pipes become rusted the oxide formed increases the electrical resistance of the pipe coating and thus prevents further electrolysis except under unusual conditions.

"Mr. Herrick, who testified at great length on both references, and whose testimony will be again referred to in connection with different systems of return, testified that while in case of lead pipes electrolysis carries sulphate or carbonate of lead into adjacent soil and thus lessens the electrical resistance, yet in the case of iron pipes the resistance is increased by the iron decomposition in the soil. The oxide surface formed on water pipes by current flow diminishes subsequent chemical action by current leaving such surface. This is corroborated by some other witnesses. Tests made by Mr. Herrick in Peoria showed

a constant rise in resistance as current continues to flow from the pipes, with some variation depending on moisture. A thin surface is formed protecting the pipe from further action, because the current is prevented from passing through the adjacent electrolyte. It seems, also, that the decomposition of the water in the electrolyte sets up a great resistance to further electrolysis and tends to stop it. The proof as a whole conclusively shows that no dependence whatever is to be placed upon the numerous general statements of the expert witnesses to the effect that wherever current leaves a pipe injury occurs. With an increasing current there is found diminishing damage. These experts have entirely failed to harmonize the undisputed facts shown by actual inspection of pipes and actual tests of current flow with their theories of decomposition of metallic substances in the earth by electrolysis attended by decomposition of the pipes themselves.

#### AMOUNT OF POTENTIAL REQUIRED TO CAUSE DAMAGE

"Especially unsatisfactory is the theory of complainant's witnesses adopted by the master that the smallest amount of current may cause injury; that 'a difference in potential of a fraction of a volt may cause electrolysis.' As a laboratory theory this sometimes is true, and sometimes not, but as applied to a general system of water pipes it is utterly untrustworthy. The inference is made by some of the witnesses because a small pressure is sometimes found on a pipe showing small damage, made at some other time, and by some other pressure, both absolutely unknown. One witness made a laboratory test by passing 1/100 amp under pressure of 1/8 volt through an electrolyte of sulphate of zinc, similar to solutions in the earth, and with zinc electrodes, and got electrolysis of the zinc anode. Whether cast-iron electrodes covered with insulating material like that used on water pipes or pieces of oxidized iron would have given a like result he does not state. Again, it is not explained how or why the weak current on the pipe does not pass through the joint rather than seek a path through a weak electrolyte near by. While this theory finds some little support in the evidence it is so inconsistent with established facts as to leave the finding without any sufficient foundation. Mr. Waterman says that an iron anode is not always corroded by the escaping current even when the electrolyte is itself split up, and that the silicon found on the water pipes will prevent corrosion; and he concludes that it is impossible to tell what amount of current it is safe to draw per square foot from the surface of a pipe. Defendant's experts generally agree that a small amount of current is not injurious. Complainant's witnesses are convinced to the contrary, and the master has followed them; but the finding is quite unsatisfactory, and so inconsistent with the nature of electrolytic action, and with the facts clearly established by undisputed evidence as to actual damage, that it cannot be sustained. It is also inconsistent with the theory of increased resistance due to water decomposition in electrolysis.

#### DAMAGE TO LEAD SERVICE PIPES ALSO DECREASING

"Lead service pipes have also to some extent been injured by electrolysis, especially near the power station. Altogether there are about 9000 of them. During the 19 years from 1890 to 1909 there have been 217 breaks in service pipes attributed to electrolysis, and many more from other causes. From electrolysis there were 12 breaks of service pipes in 1905, 8 in 1906, 5 in 1907 and 2 in the first five months of 1908. These service pipes are many of them under the street railroad tracks, and the theory of damage is that when the iron pipes are positive to the rails the current flows from the mains through the lead pipes, and then through some electrolyte in the earth to the rails, decomposing the service pipe as it goes. This injury, like that to the mains, is shown to be lessening, and the percentage of damage is not enough to show danger of the ultimate destruction of these lead pipes, even of those in the region of the power station, where almost all the breaks have occurred. Repairs to service pipes are paid for by the water consumer. It may be that the use of galvanized-iron service pipes instead of lead, near the power station, might be an improvement, but this will be left to the judgment of complainant.

## METHODS OF RELIEF

"Complainant's water works system is being damaged by electrolysis caused by electricity generated by defendant, but not so seriously as reported by the master. This injury should be stopped. Complainant cannot, in the present state of development, find any reasonably practical way to cure it. Both parties insist that the injury is curable, but they differ as to means. The subject has been most seriously studied by many engineers, and there is a difference of opinion among them whether anything short of a metallic circuit will be a complete remedy. Many other plans have been tried. The effort has been so to perfect the rail return as to prevent escape of current into the earth. No claim is made that this can be fully done, but some 11 witnesses testified on the second reference that the rails can be so bonded and cross-bonded as practically to stop electrolysis of the water pipes with the assistance of other means of negative return. Nearly as many other witnesses are of opinion that no such thing is possible, and the master agrees with them and has recommended the compulsory installation of a metallic, non-rail return circuit.

"Four plans of improving the rail return are explained by defendants' witnesses, which they think practically efficient. They have been used more or less since 1899. All of them contemplate the use of the brazed rail bond, of which defendant had installed about 6 miles at the time the testimony was closed on the second reference. This bond consists of a number of leaves of thin copper folded back and forth on themselves, with a piece of brass wound around the end and applied to the side of the ball of the rail near the end. The rail is first ground with an emery wheel to make it clean and bright. Then the end of the bond is clamped between a carbon plug and the rail and subjected to a current of 2000 amp passed through bond and joint until the brass melts and flows upon the clean rail surface, thus making a perfect and permanent electrical contact. Each bond is equivalent in conductivity to 3 ft. of rail—that is, to one-fourth as great a conductivity as that of a continuous rail—and each has a greater conductivity than the trolley wire.

"The first plan consists in the use of some efficient form of rail return, as the brazed bond, welded joint, etc., with cross wires between rails and assisting the return by feeder wires from rail to negative side of dynamo at regular distances from the power house. This is the system now in use in Peoria.

"The second plan is called the quadrilateral or constant potential system, and is simply a modification of the first, with additional bonding at crossings and switches. This system is recommended for Peoria by defendant's witnesses, with a possible addition suggested by Mr. Winters. It was called quadrilateral because of its supposed application to the case of a railway surrounding the center of a city and forming a four-sided network of rails requiring a four-sided system of negative return copper wires from the track and bringing them together to the negative side of the dynamo. The purpose is to reduce to a constant potential all the negative feeder points and by expanding the feeders in the shape of a fan to equalize the pressure all over the rail system, thus preventing as much as possible the escape of current from the rails and its return to the power house. The system was installed in Richmond, Va., by Mr. Waterman, and he claimed to have reduced the amperage on the water pipes from a varying current of considerable size to a maximum of less than 1 amp. It is also being put in at Toronto. The underlying idea is that the tendency to leakage of current from the rails varies as the square of the distance between feeders, so that the putting in of an additional feeder divides the distance by two and the leakage by four. In Richmond four copper wires  $\frac{3}{4}$  in. in diameter were attached at one end to the negative busbar at the station, and at the other each to an extended network of smaller wires attached to the rails. Each system of wires extended in a different direction.

"The third plan is called the drainage system, often used to protect the sheaths of telephone cables. In this the rails and pipes are regarded as a parallel conductor system of return feeders, pipes and rails being connected by copper wire. This

can only be put in when the owners of both systems are working in harmony. It is in use in Rochester, N. Y., where it is claimed to have avoided trouble from complaint of electrolysis. The testimony as to its efficiency is conflicting.

"The last plan is not fully described in the proofs. By this it is sought constantly to keep the whole piping system negative to the rails, so that no current can flow from pipe to rail. This may be done by copper wire, or by a 'negative booster,' an additional dynamo so connected with the pipes as to produce upon them a lower potential than upon the rails.

"The quadrilateral or constant-potential system is recommended for Peoria by defendant's witnesses, and Mr. Winters also suggests a limited use of the drainage system in addition to the other, but thinks it would not be necessary for the protection of the pipes.

"Defendant's expert witnesses agree in testifying that no system will prevent all leakage of current, but think that the quadrilateral plan will be a substantial success. Complainant's witnesses believe it to be necessary to keep all the current from the rails by the double trolley or other insulated system, and that if any current whatever gets upon the pipes they will be destroyed. This conclusion is not established by the evidence. The fourteenth, sixteenth, seventeenth and paragraphs five and six of the twentieth findings of the master on the first reference are not sustained by the proofs. The findings on the second reference need modification according to this opinion.

## CONCLUSIONS

"Defendant should be enjoined from continuing the injury to the complainant's water mains and service pipes, and should be given a reasonable time to take such measures or put in such improvements to its negative return as will substantially prevent injury. This should be upon condition that complainant cooperate with defendant so far as reasonable and proper in aiding it to prevent or lessen the escape of current from its rails, or in preventing the escape of current from the water pipes in such manner as to cause injury thereto. The matter of the terms of the decree in these respects, as well as the modification of the findings, will be further considered on application for decree.

"As to costs, I am inclined to think that neither party should have costs as against the other, and that clerks', marshals' and master's fees should be equally divided between the parties. Fees and expenses of witnesses, experts and engineers, and for examinations and tests, should be borne by the party calling the witness or requesting the services."

## HEARING ON AMENDED TRANSFER SYSTEM IN BROOKLYN

A hearing in reference to a complaint regarding the new transfer system adopted by constituent companies of the Brooklyn Rapid Transit System was held by the New York Public Service Commission, First District, on Oct. 19.

John J. A. Rogers, the complainant, said that the tariffs and schedules which had been filed seemed to him not to be sufficiently definite to be binding upon the company and to be understood by the public and he, therefore, thought the best procedure was to find out exactly what the new regulations of the company were.

George D. Yeomans, counsel for the company, said that the subpoena had been received only on the night of Oct. 17, but that the company, so far as was physically possible, was prepared to present largely what was requested. What was not presented at this hearing would be presented later.

Mr. Yeomans presented samples of transfers, notices to conductors and other notices bearing on the change and certified copies of the resolutions passed by the directors of the various companies affected. He said that the new system had been in operation for about four days and that with a total of about 4,000,000 people carried about 250 complaints had come to the attention of the company.

At the hearing on Oct. 24 a request was made for a list of points at which transfers have been discontinued. Adjournment was taken until Oct. 27.

## PUBLIC UTILITIES A CAMPAIGN ISSUE IN NEW JERSEY

Woodrow Wilson, the Democratic candidate for Governor of New Jersey, has made public a letter written by him in response to a request for an expression of opinion on various public issues. Part of the questions answered by Mr. Wilson relate to public utilities and are as follows:

(1) "That the Public Utilities Commission should have full power to fix just and reasonable rates to be charged by all public service corporations. Do you favor this?" Yes.

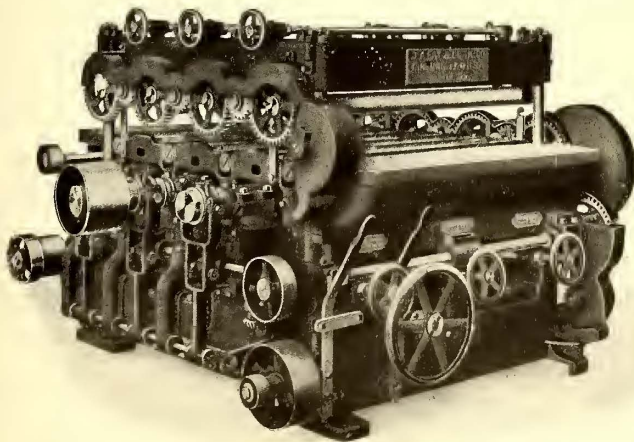
(2) "That the physical property of each public utility corporation which is devoted to a public use should be valued by the State. Do you favor this?" Yes.

(3) "That such physical valuation should be taken as the assessment upon which such corporations shall pay local taxes. Do you favor this?" Yes.

(4) "That such valuation should be used as a basis for fixing rates to be charged by these corporations and that such rates should be so limited as to allow them to earn not exceeding 6 per cent upon this valuation. Do you favor this?" No. I think that such valuation should form a very important part of the basis upon which rates should be fixed, but not the whole basis. All the financial, physical and economic circumstances of the business should be taken into consideration. The percentage of profit should be determined by the commission after full inquiry and not by statute.

## A NEW SANDER

The accompanying engraving illustrates a new type of triple drum sander built by J. A. Fay & Egan Company, Cincinnati, Ohio. The machine is designed to meet the most exacting requirements where a perfectly smooth surface is wanted for varnishing or painting. An automatic take-up device holds the sandpaper tight on the drums under all working and atmospheric conditions. It is claimed that all three of the drums can be covered with sandpaper by any ordinary mechanic in 7 minutes. The drums are covered with specially prepared non-stretchable combination rubber and felt, which forms an effective cushion for the paper. On this machine the oscillators are pivoted on a rigid shaft so that all weight is taken off of the drum shafts. This prevents wear of the drum-shaft bearings and the oscillator bearings cannot wear as the shaft does not touch the walls of the bearings. The bed frame is made to lift by power clear of the drums so as to give easy access to the drums. When the bed frame is hoisted the drums may be re-

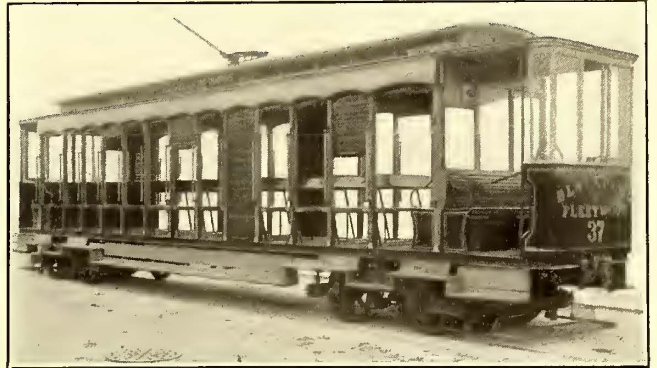


Triple Drum Sander

moved from the machine without disturbing the table plates. The column of the machine is made extra heavy to prevent vibration. The feeding mechanism consists of four top rolls and four bottom rolls, all positively geared. The top rolls are adjustable vertically to receive material up to 8 in. thick. These triple drum sanders are being built in nine sizes from 30 in. to 80 in. wide.

## COMPENSATING BOLSTER TRUCK

The Blackpool & Fleetwood Electric Tramways, England, have recently installed several trucks furnished with a new type of bolster, designed and patented by J. E. Anger, works manager of the United Electric Car Company, Ltd., Preston, Lancashire, Eng. The object of the bolster is to limit the oscillation experienced when operating double-truck cars. This arrangement is considered to be a much-needed improvement in



Car Equipped with Compensating Bolster Trucks

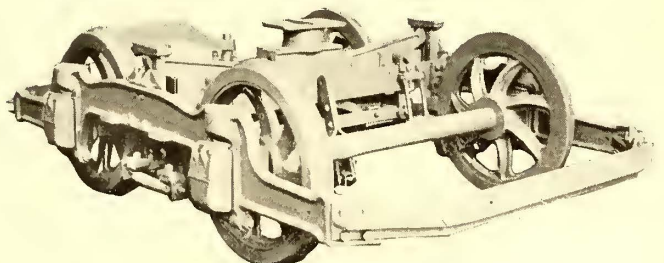
swing bolster trucks for carrying a car level and counteracting the effect of centrifugal force on curves.

The center bearings and side bearings of this truck bolster are carried on cantilevers which are supported on fulcrum pins. The truck bearings are free to move vertically and adjust themselves to the variation of the load. The fulcrum pins are fitted to bolster plates of the ordinary pattern which are supported at each end by springs. These springs are in turn suspended from the truck transoms in the ordinary way, that is, by suspension links hung from the truck transoms.

The distribution of the load is accomplished by the center bearing and cantilevers. The center bearing is of the ordinary center pivotal type, but the bottom half is carried on the short arms of the two cantilevers; the load at this point is supported on a three-point suspension and the action of the cantilevers tends to counteract the effect of the load on the truck frame and wheel flanges toward the outer rail when the car is entering or leaving a curve.

The method of operation is as follows:

In entering, leaving or rounding a curve the compensating levers counteract the roll or hammering due to centrifugal force on the outer rail, thus distributing the weight equally over all wheels and portions of the truck frame and lessening the friction and wear between flanges of wheels and rails. When operating on straight track the action of the compensating levers, with their three bearing surfaces in constant contact with the center bearings and side bearings on the car-body bolster, is such as to prevent the oscillation and rocking of the trucks.

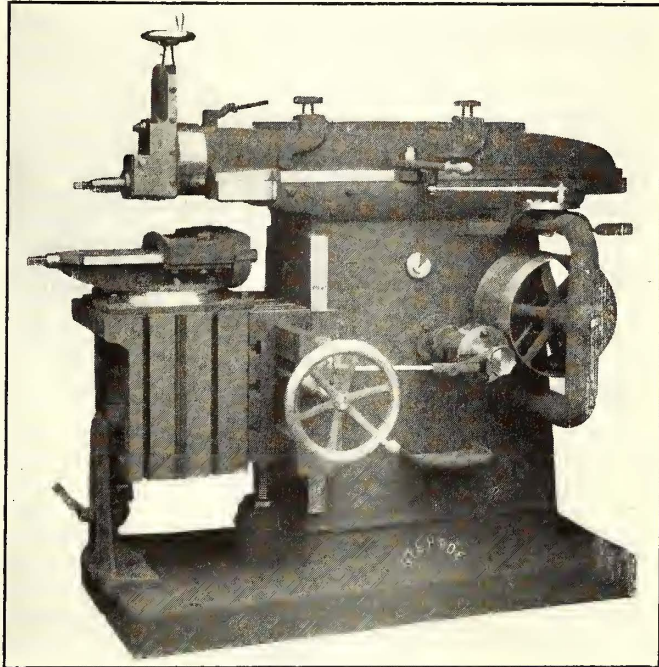


Compensating Bolster Truck

The improvement described, apart from giving easier riding, decreases the wear and tear of both track and rolling stock and should result in lower operation and maintenance cost. Compensating levers of this design have been fitted to double trucks of the equal-wheeled type, and to maximum traction trucks of the swing bolster type. They are also applicable to any type of double truck for either light or heavy service.

### NEW TRIPLE-GEARED SHAPER

The John Steptoe Shaper Company, Cincinnati, Ohio, has recently placed on the market a new 25-in. triple-geared shaper, shown in the accompanying engraving. All of the shaft bearings in the column of this machine are bushed with cast-iron bushings and provided with ring oilers. The shafts are turned with spiral oil grooves to ensure the proper distribution of the



Triple-Geared Shaper

oil over the entire bearing. The ram is driven by means of two rack gears of large diameter, and the rack is cut from the solid steel bar. The teeth in the rack are staggered to give an even pushing strain on both gears. The use of two gears permits the passing of bars through an opening in the top of the column for key-seating, which cannot be done where only one large gear is used. The plate for shifting the belts has eccentric slots so arranged that one belt is shifted before the other. The head can be very quickly loosened and swiveled to any angle by pushing the lever at the back of the head and can be fastened by pulling the lever toward the operator. The shifter dogs are placed on top of the ram in a very convenient position, permitting a ram of larger and stronger dimensions to be used.

All wearing surfaces are provided with flat gibs, and the screws for adjusting the gib in the ram and harp slides are fitted with lock nuts. The lead screw and harp-slide screw are provided with hand wheels. The table support has a roller which slides on a plane surface under the table, and can be very quickly adjusted by the lever shown in the illustration. The machine is geared 42:1 and is made to take very heavy cuts with high-speed steel. The column, ram and base are ribbed and braced, and all bearings are made very heavy.

The vise has a graduated swivel base which can be easily read by the operator. The upper jaw of the vise grips the lower jaw, thereby preventing the upper jaw from rising when the work is being tightened in the vise.

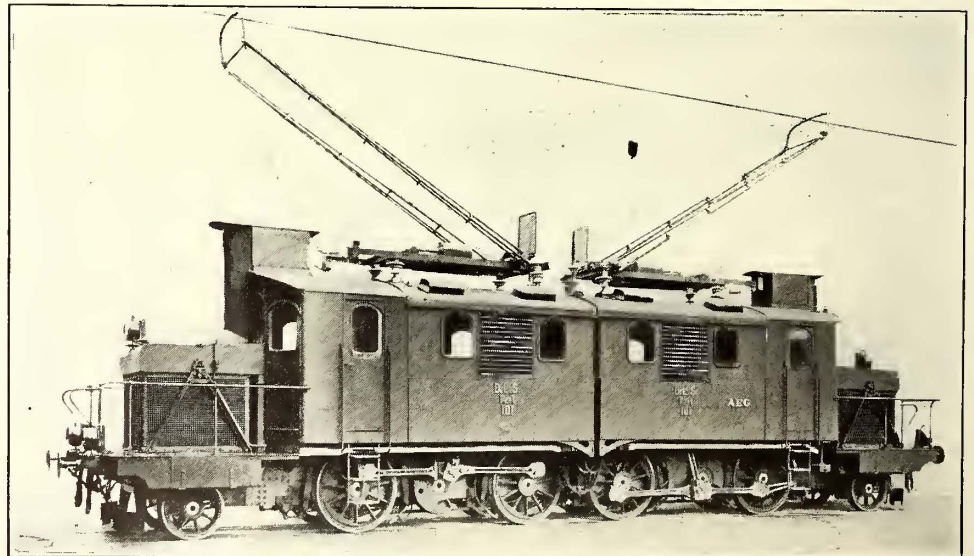
### SINGLE-PHASE LOCOMOTIVES FOR THE BERNE-LOTSCHBERG SIMPLON RAILWAY

The Bernese Alps Railway, Switzerland, has recently received from the Allgemeine Elektrizitäts-Gesellschaft two 4-ft. 8½-in. gage single-phase locomotives which are designed for operation at a maximum speed of 75 km (46.5 miles) an hour, at 15 cycles, 15,000 volts. The maximum tractive effort at the periphery of the driving wheels on starting is 13,500 kg (29,700 lb.) and the drawbar pull for one hour at 40 km (24.8 miles) an hour is 8000 kg (17,600 lb.).

On a 2.7 per cent grade a train weighing 250 metric tons must be drawn at a speed of 24.8 m.p.h. and on a 1.55 per cent grade a 400-ton train must be drawn at the same speed for one hour. The locomotive is built for parallel crank drive. The two 800-hp motors are mounted in the upper part of the locomotive frame and transmit their energy by driving and connecting rods through an intermediate jack shaft to the two driving axles. The locomotive is built in two halves, which are similar in every respect. The principal dimensions, the weight and other details are given herewith:

Diameter of driving wheels.....	1,270 mm.	50 in.
Diameter of leading wheels.....	850 mm.	33 in.
Diameter of crank circle.....	540 mm.	21 in.
Length over buffers.....	15,750 mm.	51 ft. 8 in.
Total wheel base of the double locomotive.....	15,750 mm.	51 ft. 8 in.
Wheel base of one half.....	5,300 mm.	17 ft. 5 in.
Distance between centers of pony tracks.....	4,250 mm.	13 ft. 11 in.
Pressure on driving axles.....	17 tons	
Pressure on leading wheel axles.....	12.5 tons	
Weight of the mechanical portion.....	44 tons	
Weight of the electrical equipment.....	49 tons	
Total weight.....	93 tons	
Weight available for traction on four axles.....	68 tons	

These locomotives will be operated on open track with a minimum curve radius of 250 m (820 ft.) and the railway stations with a minimum curve radius of 180 m (590 ft.). To attain smooth running and flexibility on curves leading running axles were adopted. As a sliding axle when used for the leading wheels exhibits a tendency to set up rocking it was decided to employ a form of pony truck. The running axle, therefore, is combined with the adjoining coupling axle in pony truck of a Kraus-Helmholtz type. The new construction ensures an even wear of the flanges of both running wheels. The running axle can turn independently, within narrow limits, on a straight track and can also swing slightly in a horizontal direction. Means are provided to keep the running axle at right angles



Single-Phase Locomotive for Berne-Lotschberg Simplon Railway

to the longitudinal axis of the locomotive when traveling on tangents.

The machine compartment and motorman's cab of each half of the locomotive are separate. The former is constructed throughout of sheet iron and has a sheet-iron roof on which the current collector is carried. Each machine compartment contains an air compressor in addition to the traction motor.



One of the halves also has a converter set and a storage battery. The sides of the locomotive are partially perforated for motor ventilation, the exhaust passing through the roof. The control apparatus compartment is in the rear and the transformer set is in the front of each motorman's cab. The braking equipment consists of a combination Westinghouse automatic and hand-operated brake; also a separate hand-wheel brake. In addition, the locomotive is equipped with speed indicators, pneumatic sanders, electric and petroleum signal lamps, fog horns and the usual tools.

The current collectors are of the sliding bow type constructed for clearances varying from 4.8 m (15 ft. 9 in.) to 7.5 m (24 ft. 7 in.). This wide range of height adjustment necessitated a long and narrow construction of the current collector frame, the sides of which consist of three pyramid-shaped tubes. The contact piece adjusts itself automatically to the direction of travel. Wind shields are provided to counteract the effect of wind pressure on the current collector frame. The current collector is operated by compressed air.

### EXPANSION CAR WHEEL BORING TOOL

One of the most interesting exhibits at the recent Atlantic City convention was that of the Davis expansion car wheel boring tool. This tool is being used by a number of electric railway companies, among them: Detroit United Railway, East St. Louis & Suburban Railway, Cleveland Electric Railway, Louisville Railway, United Railways of St. Louis.

At the last Master Car Builders' convention a report was accepted which recommended that all car wheels should be bored to fit the axles in two independent cuts and that these operations were preferably to be accomplished by some form of car wheel boring tool having a micrometer adjustment and that the fits were to be determined by the use of micrometer calipers.

The Davis expansion car wheel boring tool was designed to accomplish this result and has also effected a decided reduction in the cost of wheel and axle work in many of the steam railroad shops of the country. It can be applied to any make of wheel-boring machine. Previous to the in-

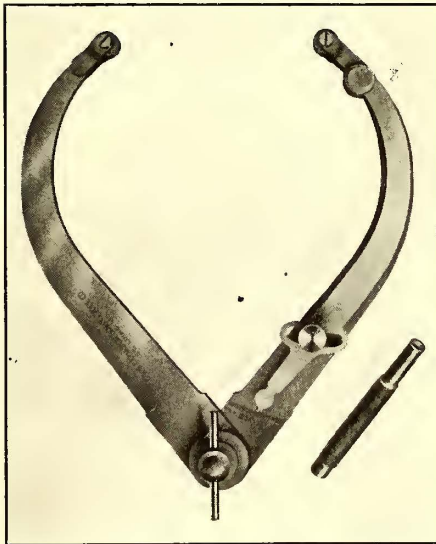


Fig. 1—Micrometer Caliper to Adjust Tool for Boring Wheels

roduction of these tools it was customary in railroad shops to turn all axles to fit the wheel. The average output of the wheel-boring machine at that time was 40 to 50 wheels per day. The average of the wheel-boring machine equipped with the Davis expansion boring tool is said to be 80 to 120 wheels per day.

An instance of the saving effected can be taken from the records of the Canadian Pacific Railroad at Montreal. In its new shops with absolutely new and up-to-date wheel-boring mills 35 wheels were being bored per day on each mill, using the old-style boring tool. Since the equipment of these shops with Davis expansion boring tools an average output from the Montreal shops has been obtained of 119 wheels per day of 10 hours.

These tools are especially adapted for boring the wheels to fit the axles. It requires but 10 to 20 seconds to adjust the tool

to bore the wheels for the axles and to make a perfect hydraulic fit. This is accomplished by means of the micrometer caliper shown in Fig. 1, which has recently been brought out by the manufacturers and can be operated by any ordinary machine hand.

The expansion car wheel boring tool for steel wheels is shown in Fig. 2. One for cast iron is shown in Fig. 3. It will be noted that each tool is equipped with two sets of cutters and one chamfering cutter at the top. The lower set is especially made for rough boring. It cuts freely and easily and involves the same principle as the turning tool. The cutter itself carries away the chips and causes them to curl in a parallel direction with the tool, thus preventing them from eating into its body.

The upper single cutter is easily adjusted by means of a special screw to correspond with the bore of the hole. It chamfers the hole immediately after the roughing cutter has passed through the wheel. It prevents the wheel from cutting the axle when being pressed through. It is removed from the tool while the finishing cutters are passing through the wheel. The upper or second cutters are especially made for finished boring. They have a wide cutting surface and will bore a smooth hole with an unusually coarse feed, it being an easy matter to keep them in perfect condition. The cutters are made unusually heavy to withstand the most severe strains and perform each individual operation with mechanical correctness, yet can be quickly and easily adjusted.

The tools described are manufactured by the Davis Expansion Boring Tool Company, St. Louis. The personnel of this concern has recently changed somewhat, and the officers are now:



Fig. 2—Cutter for Use with Steel Wheels

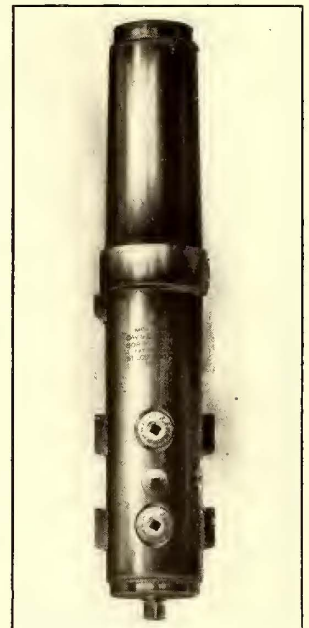


Fig. 3—Cast-Iron Wheel Cutter

W. N. Matthews, president; Emory E. Davis, vice-president, and Claude L. Matthews, secretary. W. N. Matthews and Claude L. Matthews are members of the well-known firm of W. N. Matthews & Brother.

Owing to the salt-laden atmosphere of Charleston, S. C., the ordinary form of grid resistance of asbestos and iron ribbon cannot be used because they corrode rapidly and pop open. The Charleston Consolidated Railway & Lighting Company is therefore using three-suspension spiral resistances which are mounted on micanite bars fitted with intermediary micanite washers. The spirals were furnished by W. R. Kerschmer, New York. Another unusual maintenance feature on the lines of the Charleston Consolidated Railway & Lighting Company is the repairing of worn Stanwood car steps by covering them with lead tread.

# News of Electric Railways

## Report of Cleveland Railway for September

The report of the Cleveland (Ohio) Railway for September, 1910, shows a deficit of \$8,466.70 under the terms of the Tayler franchise. For the first time since March, 1910, a surplus was shown in the maintenance and repair fund. It amounted to \$14,579.51. Through the summer months the company renewed several sections of track and made other improvements, depending upon the surplus during the winter to offset the deficit thus incurred. The operating expenses for September were \$262,790.97, while the amount allowed under the franchise was \$256,853.88. The amount spent for maintenance and repair was \$119,431.21, whereas the franchise allowance was \$134,010.72. Thus the expenditures for operation and maintenance were equalized to some extent by the surplus in the maintenance account. The total number of passengers carried was 20,210,570, or about 4,000,000 more than for September, 1909. The number of transfers issued was 5,069,952. The report follows:

Gross receipts.....	\$520,616.56
Operating expenses.....	390,864.60
Net earnings.....	\$129,751.96
Other income.....	2,870.35
Gross income.....	\$132,622.31
Taxes.....	27,907.95
Net income.....	\$104,714.36
Interest.....	113,181.06
Deficit.....	\$8,466.70

During the week of the Centennial celebration of Cuyahoga County, beginning with Oct. 10, 1910, and including the Sunday which followed, 5,332,966 passengers were carried and the receipts were \$136,997.79. On Oct. 15, 1910, 888,451 passengers were carried and the receipts were \$23,649.86. This has been exceeded by only one day in the history of the system, Dec. 24, 1909, when the receipts under the receiver were \$23,804.78.

## No Bids for Constructing New York Subway with Private Capital

The time for receiving bids for the construction and operation of the tri-borough subway system, as planned by the Public Service Commission of the First District of New York, on the contract calling for construction and operation by private capital expired at noon on Oct. 20, 1910, without any bids having been received. On Oct. 27, 1910, the commission will open bids for the construction of the same system with municipal capital. Some time ago the Bradley-Gaffney-Steers Company, New York, N. Y., submitted a proposal to the commission for the construction of the system, but it did not bid on account of the differences between the plan submitted by it and the requirements which the commission sought to impose. The letter from the Bradley-Gaffney-Steers Company to William R. Willcox, the chairman of the commission, explaining its attitude, follows:

"We regret that we are unable to submit to you to-day a bid in accordance with your invitation for the building of the Broadway-Lexington Avenue subway by private capital. The proposed contract submitted to bidders is so different from the proposition which we submitted to you that we do not see how private capital can accept the terms you offer. Our proposition as submitted called for a first lien upon all income for the purpose of making payments of interest and amortization upon private capital invested before anything should be set aside for interest or amortization of city moneys employed. The proposed plan gives no such preference to private capital, and as we outlined to you at the time of the public hearing upon the proposed contract, we believe that this change, so fundamental, is the difference between the success and failure of the plan. We wish to thank you for the many courtesies we have received in the progress of our negotiations."

After reading the letter, Mr. Willcox made this state-

ment in reply to the contentions made by the company:

"The draft contract for the construction, equipment and operation of the tri-borough line was submitted to criticism at a public hearing held on May 9, 1910, at which a representative of the Bradley-Gaffney-Steers Company objected to the proposed form on three grounds, namely:

"First—That the contractor and not the city was obligated to provide real estate.

"Second—That a term of only five years was allowed for what was designated as the municipally maintained railroad, comprising the lines and the approaches thereto over the bridges.

"Third—That the contractor was obligated to pay interest and sinking fund payments on city bonds in advance of similar payments on company bonds.

"In the light of the information gained at the public hearing, and after conference with the transit committee of the Board of Estimate and Apportionment, consisting of the Mayor, the Controller and the President of the Board of Aldermen, the commission modified the form of contract in order to provide that real estate should be acquired by the city. It also modified the contract, cutting out the five-year term and making the term for the operation of the so-called municipally maintained railroad the same as that for the whole line. It modified the provision in regard to order of payments so as to put city bonds and company bonds on a parity; that is, the payments on either class of bonds were not to be given preference over the other.

"This is as far as the commission thought it proper to go with due regard to the safeguarding of the public interest. Over \$25,000,000 worth of bonds have been authorized for the construction of the loop lines and the Fourth Avenue subway, and the commission did not consider it proper to make these bonds practically second mortgage bonds."

## Boston Chamber of Commerce Urges Thorough Study of Transit Needs

The directors of the Chamber of Commerce of Boston will present to that body on Oct. 27, 1910, a report in favor of a thorough study of the transit needs of Boston, with particular reference to the systematic development of rapid transit connections between the heart of the city and the suburbs. The report will urge that no action be taken at present by the Chamber of Commerce in favor of the proposed West End loop and the proposed Boylston Street subway or any other subway until the report on the needs of the city as a whole has been completed. The report says in part:

"We have been asked from time to time to recommend that the chamber favor various additions to or changes in existing transportation facilities of the city. Usually the addition or change has been urged by persons who wished to advance the interests of a particular district in which they held investments. To consideration of such requests your committee on public utilities has devoted much time, but with a steadily growing conviction that, while the interests of a particular district are entitled to serious consideration, the transportation problem ought to be considered in a broader way and with a view to devising and providing the system of transportation which will best serve the requirements and convenience of the whole Metropolitan District. The problem has not been dealt with in any such broad way. This is apparent from the history of the shifting transportation legislation during recent years.

"The Boston Transit Commission and the Massachusetts Railway Commission have now jointly been directed by the Legislature to report to it as to the wisdom or lack of wisdom of undertaking a considerable number of specific projects; but they have not been specifically directed to make investigation of the transportation situation in Boston and the probable requirements of the future and to lay out a plan which will meet those requirements.

"We think that there is real and imminent danger of a

patchwork transportation system, not based on any comprehensive and carefully studied plans, but resulting from a yielding on the part of the Legislature to the demands of particular districts. Moreover, any plan which merely provides for present transportation needs is not sufficient. The volume of our street car traffic increases so rapidly that it is folly to provide for or consider only the present or the immediate future.

"In 1871 the street railways within 10 miles of the State House carried 34,000,000 passengers. In 1881 they were carrying 68,000,000, and in 1891 they carried 136,000,000. In 1901 the Boston Elevated Railway and its leased lines carried 213,703,983 passengers and last year the elevated lines carried 281,008,471 passengers, nearly one-third as many people as all the steam railroads in the United States combined carried in the same length of time.

"We feel very strongly that the imperative need at present is to abandon the method of trying to decide whether this or that patch or addition on the existing system is for the advantage of some district and to adopt the method which has not been used by Boston since the rapid transit commission of 1892 of having some permanent board charged with the duty of making a progressive study of the present and future requirements of the Metropolitan District and of formulating plans to meet those requirements.

"We recommend that the chamber take action that will result in a thorough report by the joint commission or some other public board as to present and prospective transportation needs and as to how far those needs will be met by the changes already contemplated by statute and as to whether they would be better met by different or further changes; also that the joint commission or some other permanent board be charged with the duty of making progressive studies and recommendations as to the transportation needs of the Metropolitan District from time to time and the best means of meeting those needs."

#### Student Course for Stone & Webster Employees

Acting upon a suggestion by S. C. Lindsay, assistant electrical engineer, officials of the Seattle (Wash.) Electric Company have approved of a plan for giving electrical students a practical education in the departments of the Seattle Electric Company. The plan submitted to the officers of the company in the form of a brief prospectus follows:

"This course shall be known as the 'The Seattle Electric Company's Students' Course.'

"The object of this course is to develop men to meet the needs of the Seattle Electric Company in responsible operating positions. The course will be of 2½ years' duration and will consist of training in the following lines of work:

"Electrical construction, both station and line work; central station operating, both steam and electrical apparatus; a small amount of meter testing and such office engineering work as conditions permit will also be given.

"Applicants who have not had a college training will be required to pass an examination in order to prove their qualifications for entering the course. Examination will be more of a practical than of a technical nature.

"All students must be over 21 and under 30 years of age. Persons already in the employ of the company will be given preference when selecting students.

"Students will be required to study standard works relating to the kind of work on which they are employed and to attend lectures once a week relating to the same subjects. Time on each class of work to be approximately as follows: Line department, 3 months; meter department, 6 months; engineering office work, 6 months; steam and electrical operating, 15 months.

"Students not already in the employ of the company and who may be selected from the list of applicants shall receive \$50 per month upon entering the course. A record of the students will be kept and their showing in each department reported by the head of the department, so as to determine their fitness for any particular line of work.

"Some one person will have charge of the students and arrange for their transfer to the various departments and for lectures and special duties. Heads of departments will be required to keep the person in charge of the students advised of such vacancies, as students would be expected to fill so the proper assignments can be made.

"It is desired to start a class of 10 students this fall, and the number will probably be increased next year by adding students as vacancies occur. Students who complete the course will be given a diploma, and if we have more graduates than this company can use, we will endeavor to place them with other Stone & Webster companies, if possible; if not, we will try and place them with some other company desiring capable men.

"Men already in the employ of the company wishing to enter this course will be examined and given proper credit for work already performed and assigned a position in the course in accordance with their qualifications. Employees wishing to enter this class must apply on the regular form for the course.

"Application blanks will be furnished by heads of departments to employees wishing to apply for enrolment. Additional information can be had by applying to S. C. Lindsay, electrical engineering department."

#### Dispute Between Winnipeg Electric Railway and Its Employees

On Oct. 12, 1910, the Winnipeg (Man.) Electric Railway dismissed four men because they violated the rules by drinking at a bar while in uniform. Three of these men had been with the company for more than five years. The men deny that they were drinking and state that one of them has been a teetotaler for 24 years. On Oct. 13, 1910, a committee from the men waited on the company, but the company refused to reinstate the men pending an investigation.

Wilson Phillips, acting manager of the company, wrote the following letter to the committee of employees selected to deal with the case of the men who were discharged:

"The discharge took place because of complaints received by us that these men were in hotels in the city drinking intoxicating liquors while in the uniform of the company.

"When you presented your ultimatum to reinstate the men or there would be a strike, I pointed out to you that, under the agreement entered into between the company and the men as a result of the last arbitration, provision was made for investigation of any reasonable complaints made by the men, and as I told you I was prepared to have a full and thorough investigation take place at the very earliest possible moment.

"The statement that this is a case of discrimination is entirely incorrect. The dismissal of these motormen and conductors was brought about in the ordinary discharge of my duties as acting manager. The complaint was made to me of the conduct of these men with reference to drinking, and I have no alternative but to enforce the rules laid down by the company.

"I told you and the men in question explicitly why they were discharged, but as you refused to say whether you would ask for an investigation or not, I declined to produce my evidence pending a decision by your committee as to whether you wanted an investigation or not.

"I need hardly point out to you that the Parliament of Canada has passed an act in the interests of and for the protection of the public in just such disputes as this, which makes it illegal for employers of labor to declare a lockout, or for employees to strike without first applying for a board of conciliation and submitting the questions in dispute to it."

Subsequently the men realized that they were in error in regard to calling a strike, and the question of the right of the company to deal as it did with the men who were discharged will be submitted to arbitration under the Dominion Industrial Disputes Acts, to which reference was made by Mr. Phillips in his letter to the men.

#### Explanation of Reduction in Working Force in Pittsburgh

In carrying out improvements to its lines recently the Pittsburgh (Pa.) Railways found it necessary to increase the number of men employed in its shops and various departments. The improvements having for the most part been completed, the company early in October laid off about half the men engaged for its extra force. In explanation of the action of the company James D. Callery, its president, has addressed to the motormen and conductors a circular in which he says:

"An extraordinary amount of work has been done in the shops during the last six months, the force of men having been increased by more than 200 over the same period in 1909. The extra work having been completed, the company must of necessity reduce its force. In consequence slightly over one-half of the extra force was laid off. The company cannot understand why the motormen and conductors in its employ should call a meeting to break their contract with the company and we believe that when they fully consider the proposition they will not do so. We were informed when the contract was entered into with the committee that the graduating scale of wages and the working conditions were satisfactory and would put the question of disputes out of the way for two years. It has always been the policy of the company to find employment wherever possible for faithful employees, and the company is now willing to receive applications from the car barn and shop men who have been laid off for positions as motormen and conductors."

### Transit Affairs in New York

The Public Service Commission has reported on the progress of the work on the Fourth Avenue subway in Brooklyn. Section 1, known as the Flatbush Avenue extension, running from Nassau to Willoughby Street, is 47 per cent completed, some 94,600 cu. yd. of material having been excavated to date. The section between Bridge Street and Myrtle Avenue is practically completed. An average of 50 per cent of the work has also been done on the sections which William Bradley is building down Fulton Street from Willoughby Street to Ashland Place, to Flatbush and Fourth avenues, to Sackett Street. This is the most difficult division of the entire route, running through the heart of the business section of the borough. It has been necessary to demolish several buildings, and undoubtedly several more will have to come down before the work can be completed. A large part of the work on the lower sections of the subway from Sackett Street to Tenth Street and from Twenty-seventh Street to Forty-third Street has also been completed. The work has been easier here, the excavation being made in outlying districts which are not densely populated.

**Franchise Cases Transferred.**—Attorney-General O'Malley, of New York, has obtained orders from the Supreme Court transferring to New York County writs of certiorari brought by the Metropolitan Street Railway, New York, N. Y., to review the taxes on its special franchises. The total amount of valuations placed on the franchises aggregates \$58,000,000.

**Monorail Company Desires Extension of Time.**—The Board of Estimate and Apportionment of New York has referred to its transit committee the application of the Pelham Park & City Island Railroad for an extension of time until next spring in which to complete and place in operation its monorail railway between Pelham Park and City Island, a distance of 3 miles.

**Meeting of Massachusetts Street Railway Association.**—The first fall meeting of the Massachusetts Street Railway Association was held at Young's Hotel, Boston, Mass., on the evening of Oct. 19, 1910. President R. S. Goff occupied the chair and after the usual dinner the salient features of the recent convention of the American Electric Railway Association were reviewed.

**Mayor Busse of Chicago Approved Consolidated Traction Ordinance.**—Mayor Busse of Chicago has approved the ordinance passed by the City Council of Chicago to permit the rehabilitation of the principal lines of the Chicago Consolidated Traction Company and to allow the purchase of the property of the company as contemplated in the reorganization plan by the Chicago Railways, to which reference was made in the *ELECTRIC RAILWAY JOURNAL*, of Oct. 22, 1910, page 887.

**Report on Transit Conditions in Pittsburgh.**—Edward M. Bigelow, former director of Public Works of Pittsburgh, Pa., has presented to the Mayor of Pittsburgh plans for relieving street railway congestion in the heart of the city based on a study of the situation which he made recently.

Mr. Bigelow's plan provides briefly for four loops in the down-town section, the utilization of a number of streets not now occupied by street car lines and the rerouting of several lines of cars. The changes suggested by Mr. Bigelow are given in detail by him in his report.

**Complaint on Account of Delay in Installing Signal Plant.**—The Lehigh Valley Railroad has complained to the Public Service Commission of the Second District of New York that the completion of its signal plant in Cheektowaga, Erie County, has been prevented for more than a year because of objection on the part of the International Railway to the installation of certain derrails. This the Lehigh Valley Railroad believes is a specious objection and made for the purpose of delay and the complainant desires that proper protection be afforded at this crossing as soon as possible.

**Date Set for Opening Hudson & Manhattan Railroad Extension.**—William G. McAdoo, president of the Hudson & Manhattan Railroad, which operates under the Hudson River between New York and New Jersey, has announced that the operation of trains will be extended from the present temporary terminus of the company at Sixth Avenue and Twenty-third Street, New York, to Herald Square at Thirty-fourth Street and Broadway on Nov. 10, 1910. The company expects to begin work on the line from Herald Square to the Grand Central Station, at Fourth Avenue and Forty-second Street, in about three months' time.

**Meeting of the New England Street Railway Club.**—The regular monthly meeting of the New England Street Railway Club will be held at the American House, Boston, Mass., on Oct. 27, 1910. Dinner will be served at 6:45 p. m. At 8 o'clock the regular business meeting will be held, after which A. D. Clafin, president of the Boston Suburban Electric Companies and general manager of the recent Harvard-Boston aviation meet, will present some interesting data "Relative to Aviation Meets," and A. A. Merrill, expert on aeronautics, and secretary of the contest committee of the Harvard-Boston aviation meet, will address the club on "Development and Progress of Aeronautics," illustrating his remarks with stereopticon views taken at the recent meet.

**Conference Regarding Sale of Toronto Railway to City.**—At a conference on Oct. 10, 1910, between the Board of Control of Toronto and representatives of the Toronto Railway, William MacKenzie, president of the company, stated that if the ratepayers of the city voted in favor of the city taking over the property of the company he would recommend the stockholders of the company to dispose of their holdings to the city at a price to be mutually agreed upon, or to be determined by arbitration. The Board of Control will report the result of the conference with the company to the City Council and a by-law will probably be submitted to the ratepayers to determine whether they favor the purchase of the street railway by the city. Mr. MacKenzie, however, stated that he would not advocate the sale of the radial railway now operated by the Toronto & York Railway, which is controlled by the Toronto Railway through ownership of its capital stock.

**Franchise Matters in Toledo.**—In a letter to the committee on finance of the City Council of Toledo, Ohio, Mayor Whitlock has suggested that the company which secures a franchise in Toledo should be required to pay the bill of \$6,500 incurred in securing the report on the earnings of the Toledo Railways & Light Company submitted by Nau, Tanner & Rusk and any other expenses to which the city may be put in the franchise negotiations. Itemized, the original bill of Nau, Tanner & Rusk follows: One principal, 64 days, at \$25 a day, \$1,600; senior accountant, 93 days at \$15 a day, \$1,395; junior accountants, 296 days, at \$10 a day, \$2,960; traveling expenses and hotel bills, \$842.73; total, \$6,797.73. Later the bill was revised and made \$6,500. This report is to be supplemented by an inventory of the property of the company now being prepared by Ford, Bacon & Davis, of New York. Plans are being made to discuss the franchise question publicly later in the year. The Mayor has stated that he expects to make addresses in every ward in the city so as thoroughly to acquaint the people with the conditions that govern the granting of the new franchise.

# Financial and Corporate

## New York Stock and Money Market

Oct. 25, 1910.

In spite of the fact that for the past two days stocks have been lower and there has been some selling pressure, the general condition of the Wall Street market is improved and the sentiment of the Street is distinctly cheerful. The present reaction is attributable to the tightening up of the money market and the desire of many holders to take profits. No great boom in prices is expected or desired, but it is believed that within a few weeks trading will increase and that the outside public will be in the market.

The bond market is neither so strong nor so active as it was a few weeks ago. This is due to the higher price of money and reawakened interest in stocks. Money to-day was quoted: Call, 3@4 per cent; 90 days, 4@5 per cent.

### Other Markets

There were sharp breaks in traction stocks on the Philadelphia market, following the letter of E. T. Stotesbury read at the meeting of the Union Traction directors yesterday. The transactions in both Union Traction and Rapid Transit have been heavy, in the two days, and prices have declined to 38 for Union and 15½ for Rapid Transit.

In the Chicago market Series 2, Railways Certificates, and Metropolitan El. preferred have each been traded in moderately at slightly higher prices.

There has been little traction business in Boston during the week. A few shares of Massachusetts Electric and Boston Elevated have sold at former prices.

In Baltimore there has been no trading in traction stocks and the transactions in the bonds of the United Railways have been fewer. Prices have remained about the same.

Quotations of various traction securities as compared with last week follow:

	Oct. 18.	Oct. 25.
American Railways Company.....	443¾	443½
Aurora, Elgin & Chicago Railroad (common).....	448	450
Aurora, Elgin & Chicago Railroad (common).....	448	450
Boston Elevated Railway.....	128½	128
Boston & Suburban Electric Companies.....	14¾	*14¾
Boston & Suburban Electric Companies (preferred).....	72	*72
Boston & Worcester Electric Companies (common).....	*10½	*10½
Boston & Worcester Electric Companies (preferred).....	36½	*36½
Brooklyn Rapid Transit Company.....	79	77¾
Brooklyn Rapid Transit Company, 1st pref. conv. 4s.....	84½	83¾
Capital Traction Company, Washington.....	*129	a130
Chicago City Railway.....	102½	a100
Chicago & Oak Park Elevated Railroad (common).....	*¾	*¾
Chicago & Oak Park Elevated Railroad (preferred).....	*7¾	*7¾
Chicago Railways, pteptg., ctf. 1.....	a75	a75
Chicago Railways, pteptg., ctf. 2.....	a19¾	a19
Chicago Railways, pteptg., 3.....	a10	a10
Chicago Railways, pteptg., ctf. 4.....	a6	a6
Cleveland Railway.....	*91½	*91½
Consolidated Traction of New Jersey.....	a73	a73
Consolidated Traction of N. J., 5 per cent bonds.....	a104	a104
Detroit United Railways.....	*45	*45
General Electric Company.....	155½	155
Georgia Railway & Electric Company (common).....	a120½	a122
Georgia Railway & Electric Company (preferred).....	87	87
Interborough-Metropolitan Company (common).....	22½	22¾
Interborough-Metropolitan Company (preferred).....	58¾	59½
Interborough-Metropolitan Company (4½s).....	81¼	81½
Kansas City Railway & Light Company (common).....	a23½	a23½
Kansas City Railway & Light Company (preferred).....	a80	*80
Manhattan Railway.....	143	a143
Massachusetts Electric Company (common).....	a20½	a20
Massachusetts Electric Companies (preferred).....	a85	a85
Metropolitan West Side, Chicago (common).....	a23	a21
Metropolitan West Side, Chicago (preferred).....	a70	a64
Metropolitan Street Railway.....	*15	22
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	67½	*67½
Northwestern Elevated Railroad (common).....	*20	a22
Northwestern Elevated Railroad (preferred).....	a43¾	a63
Philadelphia Company, Pittsburg (common).....	a46½	a45¾
Philadelphia Company, Pittsburg (preferred).....	a43	42½
Philadelphia Rapid Transit Company.....	a19¾	a15¾
Philadelphia Traction Company.....	82	a83
Public Service Corporation 5 per cent col. notes.....	a94¾	a94½
Public Service Corporation, ctf. s.....	a101	a101
Seattle Electric Company (common).....	*109	*109
Seattle Electric Company (preferred).....	*98½	*98½
South Side Elevated Railroad (Chicago).....	58	a65
Third Avenue Railroad, New York.....	10¾	12¾
Toledo Railways & Light Company.....	8¼	*8¼
Twin City Rapid Transit, Minneapolis (common).....	112½	*112½
Union Traction Company, Philadelphia.....	43¾	38½
United Rys. & Electric Company, Baltimore.....	*49¾	a15
United Rys. Inv. Co. (common).....	*15	*15
United Rys. Inv. Co. (preferred).....	60	*60
Washington Ry. & Electric Company (common).....	33	a38
Washington Ry. & Electric Company (preferred).....	89	a89
West End Street Railway, Boston (common).....	84½	a86
West End Street Railway, Boston (preferred).....	*100¾	*100¾
Westinghouse Elec. & Mfg. Company.....	72	72¾
Westinghouse Elec. & Mfg. Company (1st pref.).....	*129	*129

aAsked. \*Last sale.

## Conditions Under which E. T. Stotesbury Will Become Director of Philadelphia Rapid Transit Company

E. T. Stotesbury, of Drexel & Company, Philadelphia, Pa., has made the following reply to the petition of the stockholders of the Philadelphia Rapid Transit Company and the Union Traction Company that he enter the board of directors of the Philadelphia Rapid Transit Company and to the petition of the directors of the Philadelphia Rapid Transit Company that he become a director of that company:

"I duly received the communication signed by yourself and others interested in the Union Traction Company and the Philadelphia Rapid Transit Company requesting that I enter the board of directors of the Philadelphia Rapid Transit Company, with such associates as I might select, and thereafter 'control the policy and business of the company.'

"An earnest desire to advance the welfare of the general public, as well as the business interests of this city, prompts me to comply with your request, but in view of the Philadelphia Rapid Transit Company's financial requirements I feel that I could only accept this responsibility upon a certain definite understanding having been reached with the Union Traction Company stockholders, by which the Union Traction Company will guarantee the Philadelphia Rapid Transit Company's obligations to provide such new capital as may be required until such time as the net earnings of the system are sufficiently increased to make possible the sale of Philadelphia Rapid Transit Company's securities on their own merits.

"From the published annual reports of the Philadelphia Rapid Transit Company it appears that the net earnings during the past four years have not been sufficient to pay the annual guaranteed dividend of 6 per cent upon the Union Traction Company stock. Moreover, the net earnings of the Philadelphia Rapid Transit Company for the current fiscal year will not be sufficient, according to President Kruger's estimate, to pay this dividend.

"I have given much thought to the problem and have sought the advice of experts in the conduct and operation of similar properties, particularly Thomas E. Mitten, who has had wide experience in such matters and is now president of the Chicago City Railway. From all that I can learn, I am satisfied that a considerable sum of money will be required in the near future for necessary renewals, and also a substantial amount should be provided properly to enlarge and thus increase the efficiency and earning power of the system. It is therefore essential that a comprehensive plan be formulated whereby a fund can be provided for capital expenditures covering a period of some years, and also that a larger amount should be appropriated from the earnings of the company for renewals of the present property.

"Should the Union Traction Company stockholders agree to the lending of their company's credit for the purpose of securing the new capital necessary they will by so doing serve to increase the value of their own property, which, operated under the conditions of the Philadelphia Rapid Transit Company's contract with the city (which, however, is not transferable), will secure to the Union Traction Company's stock all of the advantages in the way of net earnings resulting therefrom up to the limit of the Philadelphia Rapid Transit Company's guarantee. In no other way can the Union Traction Company stockholders, in my opinion, secure such favorable return from the operation of their property.

"From the best information that I am able to obtain there seems to be no reason, barring unforeseen contingencies, to question the ability of the property ultimately to show substantial earnings on the present capitalization, provided a financial plan along the lines indicated can be consummated, making possible the full development of the company's earning capacity.

"In conclusion, I desire to express my appreciation of the confidence reposed in me and would be willing to accept your invitation to go on the board, conditionally, however, upon:

"First—That the Union Traction Company stockholders agree to guarantee the obligations for capital requirements.

"Second—That a sufficient amount be appropriated from

the earnings properly to maintain the physical integrity of the property."

The letter from Mr. Stotesbury was placed before the directors of the Union Traction Company on Oct. 24, 1910, and a committee consisting of Robert A. Balfour and George W. Elkins was appointed to consider the matter.

**Atchison Railway, Light & Power Company, Atchison, Kan.**—The stockholders of the Atchison Railway, Light & Power Company have voted to make a mortgage for \$1,500,000, of which \$750,000 will be issued to retire the \$400,000 of preferred stock of the company and \$150,000 of first mortgage 6 per cent bonds due July 1, 1915, and for improvements.

**Chicago (Ill.) Consolidated Traction Company.**—Attorneys for Mrs. Adelaide Yerkes, widow of Charles T. Yerkes, have filed a suit in the Circuit Court at Chicago asking that Louis O. Owsley, executor of the estate, be enjoined from exchanging \$4,594,000 of bonds of the Chicago Consolidated Traction Company for new securities to be issued by the Chicago Railways. A receiver is asked for the bonds and a decree is sought directing the Chicago Railways to pay more than \$6,000,000 now due on the bonds for principal and interest.

**Dartmouth & Westport Street Railway, New Bedford, Mass.**—The Railroad Commission of Massachusetts has approved the consolidation of the Dartmouth & Westport Street Railway and the Union Street Railway, New Bedford, the former to be absorbed by the latter. To perfect the merger the Union Street Railway will exchange \$500,000 of its capital stock share for share for the stock of the Dartmouth & Westport Street Railway.

**Eastern Pennsylvania Railways, Pottsville, Pa.**—The pamphlet report of the Eastern Pennsylvania Railways for the year ended June 30, 1910, has been made public. Aside from the consolidated statement of earnings and expenses of the company and its subsidiaries in which the gross earnings, operating expenses and taxes, net earnings, interest on bonds, loans and rentals and the surplus are given, there is a consolidated balance sheet, which shows total assets and liabilities of \$9,178,965, and a brief review of construction work carried out during the year. P. G. Gossler, president of the company, in presenting the report to the stockholders, refers as follows to the earnings of the company: "Your directors present their report for the fiscal year ended June 30, 1910, together with statement of earnings and expenses for the period, also consolidated balance sheet as of that date. The gross earnings amounted to \$629,053.38, operating expenses (including taxes) were \$366,017.45, leaving net earnings of \$263,035.93. The gross earnings increased \$49,104.01, or 8.5 per cent, and the net earnings show an increase of \$26,782.36, being an increase of 11.3 per cent. Interest and rental charges were \$208,674.38, an increase over the previous year of \$10,408.68, leaving net profits for the year of \$54,361.55, an increase over 1909 of \$16,373.68, or 43.1 per cent, which is considered very satisfactory. Of the company's bonds \$126,000 face value were issued during the year to cover part of the expenditures for construction."

**Hudson & Manhattan Railroad, New York, N. Y.**—Lewis L. Clarke, president of the American Exchange Bank, has been elected a director of the Hudson & Manhattan Railroad.

**Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.**—Judge Carter, of the Supreme Court at Indianapolis has fixed Nov. 10, 1910, as the date of the sale of the property of the Indianapolis & Cincinnati Traction Company under foreclosure. As stated in the *ELECTRIC RAILWAY JOURNAL* of Oct. 8, 1910, page 672, the minimum price fixed for the property in the decree is \$1,045,000.

**Indianapolis, New Castle & Toledo Electric Railway, New Castle, Ind.**—George A. Bushkirk and Louis F. Smith, trustees of the mortgage of the Indianapolis, New Castle & Toledo Electric Railway, have filed a suit to foreclose the mortgage.

**Interstate Railways, Philadelphia, Pa.**—The American Railways, which holds \$1,500,000 of the bonds of the Interstate Railways, has made known its disapproval of the plan to issue preferred stock of the Interstate Railways to fund

all coupons due on the 4 per cent bonds of the company in 1910 and 1911.

**Lehigh Valley Transit Company, Allentown, Pa.**—The holders of the \$300,000 of outstanding bonds of the Quakertown Traction Company have been offered \$750 in cash or \$750 in first mortgage 5 per cent bonds of the Lehigh Transit Company or \$900 in refunding and improvement 5 per cent bonds of the Lehigh Transit Company, accrued interest to be adjusted in cash, for each \$1,000 bond of the Quakertown Traction Company.

**New York, Westchester & Boston Railway, New York, N. Y.**—The Public Service Commission of the Second District of New York has approved the application of the New York, Westchester & Boston Railway for authority to issue \$5,000,000 of 50 year first mortgage 5 per cent gold bonds to pay \$953,446 advanced by the City & County Contract Company in connection with the construction of the branch line from Mount Vernon to White Plains and to meet the cost, estimated at \$4,294,549, of completing, electrifying and equipping this branch.

**Philadelphia (Pa.) Rapid Transit Company.**—The meeting of the directors of the Philadelphia Rapid Transit Company which was called for Oct. 19, 1910, was not held on account of inability to obtain the necessary quorum. City Councils have adopted a resolution which provides for a joint meeting on Nov. 3, 1910, to elect a representative of the city to the directorate of the company to succeed George H. Earle, Jr., who resigned last spring. Augustus Loeb has resigned as a director of the company because his other interests prevent him from giving the company the amount of his time which its affairs demand.

**Scranton (Pa.) Railway.**—Bioren & Company, Philadelphia, Pa., are privately offering for subscription at 97½ and interest a block of the new issue of general mortgage 5 per cent gold bonds of the Scranton Railway, dated Nov. 1, 1910, and due Nov. 1, 1920, but subject to call at any interest period at 102 and accrued interest.

**Second Avenue Railroad, New York, N. Y.**—Justice Amend has granted the application of George W. Linch, receiver of the Second Avenue Railroad, to issue \$2,500,000 of receivers' certificates, bearing 6 per cent interest, for one year. The proceeds will be used to pay interest due on Nov. 1, 1910, on \$5,682,000 of 5 per cent consolidated mortgage bonds held by the Guaranty Trust Company and about \$545,000 of franchise taxes, the amount agreed upon between the receiver and the State. The balance will be used to improve the road and equipment.

**United Light & Railways Company, Grand Rapids, Mich.**—The United Light & Railways Company, which, as noted in the *ELECTRIC RAILWAY JOURNAL* of July 2, 1910, page 55, was organized in the interest of Child, Hulswit & Company, Grand Rapids, Mich., to take over a number of public utilities, has organized as follows: Frank T. Hulswit, president; Richard Schaddelee, first vice-president; Ralph S. Child, second vice-president; Benjamin C. Robinson, secretary and treasurer; T. J. Weber, consulting engineer.

**Washington, Berwyn & Laurel Electric Railway, Washington, D. C.**—The Public Service Commission of Maryland has approved the purchase of the Washington, Berwyn & Laurel Electric Railway by the City & Suburban Railway, Washington, D. C., which is controlled by the Washington Railway & Electric Company.

#### Dividends Declared

Cape Breton Electric Company, Sydney, N. S., 1½ per cent, common; 3 per cent, preferred.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred.

Helena Light & Railway Company, Helena, Mont., quarterly, 1¼ per cent, preferred.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., quarterly, 1½ per cent, preferred.

Springfield & Xenia Railway, Springfield, Ohio, quarterly, 1¼ per cent, preferred.

Tampa (Fla.) Electric Company, 4 per cent.

West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

# Traffic and Transportation

## Fender Regulations of Massachusetts Railroad Commission.

The Massachusetts Railroad Commission has issued the following order to all the electric railways of the State in connection with the question of fenders, authorization being given by Chap. 463, Acts of 1906, Sec. 90, Part 3, which provides that a street railway shall equip its cars when in use with such fenders, wheel guards, brakes and emergency tools as may be required by the commission:

"Ordered, That the following regulations and requirements be prescribed relative to the equipment of street railway cars with fenders and wheel guards:

"1. All cars operated on surface lines by street railways (excepting cars run only as trailing cars) shall be equipped with fenders; and all cars operated on surface lines shall be equipped with wheel guards.

"2. In the opinion of the board the rigid part of all fenders should be, as near as practicable, 12 in. above the rail; and the height of wheel guards should be, as near as practicable, 4 in. above the rail.

"3. Each street railway shall submit to the board on or before Dec. 1, 1910, a blue print, sketch or photograph showing the types of such fenders and wheel guards attached to a car as it desires to use, together with the height of same above the rails, and accompanied by a petition requesting the approval of the same by the board."

## Circular on the Value of Courtesy and Loyalty

J. F. Strickland, president of the Texas Traction Company, Dallas, Tex., has addressed the following communication on the value of courtesy and loyalty to all the employees of the company:

"The value of loyalty is beyond the conception of the average man.

"The possession in a marked degree of any worthy faculty should always be an incentive to develop that faculty.

"This company already appreciates the fact that its management has been fortunate in selecting its employees from among men whose natural inclination and training have had a tendency to develop within them loyalty and a courteous disposition much above the average.

"To those who cultivate and exercise this faculty the company extends its congratulations and its thanks; but to those who may not have fully appreciated its importance, and for the purpose of encouraging still further development along this line, thoughtful consideration of the following is suggested:

"First—The principle that underlies courteous treatment of others is simply that of 'doing unto others as you would have them do unto you.'

"Second—In a highly complex and technical business such as that of the interurban there are many things that you, with your training and daily experience, understand with perfect familiarity, but which the public do not understand. Therefore, do not assume that the public should comprehend them without asking questions, but when they make inquiry of you give them the courtesy of a reply just as full and clear as you can make it—to stay within your knowledge of the facts.

"Special attention should be given to the young and inexperienced in travel, to the aged and to ladies when traveling alone.

"Third—Words are only one means of expression, and manner is quite as important. Therefore remember that a kindly and gracious manner is not only the sign and mark of a self-respecting man, but is to your words what oil is to machinery in making them move effectively to their purpose.

"Fourth—True courtesy is no respecter of persons; it remembers that 'a man's a man for a' that,' and gives a civil word and helping hand quite as readily to the ill-clad stranger as to an official of the company.

"Fifth—Courtesy is something the public not only has a right to expect of you, but it pays:

"It pays in the friends it makes you personally and as a representative of the company;

"It pays in minimizing the friction of your life, as well as that between the company and its patrons;

"It pays in raising your standing with the company; and

"It pays in the personal satisfaction resulting from having done the right and kindly thing by your fellow-man.

"Be careful in selecting your words. A man's demeanor, expression and phraseology are the index of his character; profanity and vulgarity are the opposite to refinement, culture and good breeding.

"The value of loyalty is beyond the conception of the average individual. A corporation, in some respects, is like a family, and nothing is appreciated more in a man than loyalty to his family, hence every man connected with a corporation, directly or indirectly, regardless of his position, should in justice to himself be loyal to that company's interest. Then it should be all together, all the time, for all that is right and good for the company.

"It is the desire of this company that all its representatives and employees whose work brings them in contact with the public may fully appreciate the value of courtesy, both to themselves and to the company, and that rivalry may exist in a friendly effort to see who can make the best record along this line."

**Lima Interurban Station Opened.**—The interurban station of the Ohio Electric Railway at Lima, Ohio, which was illustrated and described in the *ELECTRIC RAILWAY JOURNAL* of Oct. 22, 1910, page 874, has been opened to the public.

**Gasoline Car Service Out of Indianapolis.**—The Pennsylvania Railroad has placed a gasoline motor car in regular service on one of its lines out of Indianapolis with a view to adopting this type of car to meet the competition of the interurban electric railways.

**Car License Ordinance Proposed in Paterson.**—The Aldermen of Paterson, N. J., have adopted a resolution instructing the city counsel to prepare an ordinance to require the Public Service Railway to pay a license of \$25 a year for every car which it operates in Paterson.

**Ordinance to Limit Car Capacity in Newport, Ky.**—An ordinance to limit the number of passengers allowed on a car and to require the electric railway operating in Newport, Ky., to clean and fumigate cars at least once a week, has been introduced in the Council of Newport and referred to the committee of the whole.

**Maryland Commission Dismisses Petition for Reduction of Fare.**—The Public Service Commission of Maryland has dismissed the application of residents of Ellicott City to compel the United Railways & Electric Company, Baltimore, Md., to reduce its fare from 15 cents to 10 cents one way from Baltimore to Ellicott Bay.

**Petition to Carry Express in Boston Dismissed.**—The City Council of Boston, Mass., has dismissed without prejudice the petition of the Boston Elevated Railway to carry freight, express and baggage over its lines in Boston on the ground that the company had not given sufficient details on which to base intelligent action.

**New Haven Aldermen Reject Committee Report Which Favors Traction Expert.**—The recommendation made by the committee on railroads and bridges of the City Council of New Haven, Conn., to appropriate \$2,000 to defray the expenses of an expert to study street railway traffic conditions in New Haven has been laid on the table by the Council.

**Complaint Against Buffalo & Lake Erie Traction Company.**—The Public Service Commission of the Second District of New York has served upon the Buffalo & Lake Erie Traction Company a complaint against the manner in which cars pass each other and against the siding facilities on the Hamburg branch, which, it is alleged, are inadequate.

**Cutting Brush Which Obstructs View.**—The Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind., is clearing its right-of-way of brush wherever the view of the line is obstructed. Residents along the line who formerly refused to permit the company to cut the brush in order to make the operation of cars safer no longer object to the company clearing the right-of-way.

**Use of Commutation Tickets on New York Line Extended.**—The Poughkeepsie City & Wappingers Falls Elec-

tric Railway, Poughkeepsie, N. Y., has extended the use of 52-trip monthly commutation tickets on the Wappingers division between Poughkeepsie and Wappingers Falls to include passage on cars which are scheduled to leave either terminus before 8 a. m. and between 12 m. and 9:30 p. m.

**New Limited Service Between Tacoma and Seattle.**—About Dec. 1, 1910, the Puget Sound Electric Railway will establish an especially fast limited service between Tacoma and Seattle between 8 a. m. and 8 p. m., trains to leave the cities every hour on the even hour. The new limiteds will be scheduled to make the run between the cities in less than 70 minutes. The local service will probably be continued as now operated.

**Electric Railways Boost Trade of Louisville.**—Electric railways have played a prominent part in the recent campaign of the Louisville Commercial Club to boost Louisville as a trade center. Fifty representative merchants and manufacturers of Seymour, Ind., were entertained by the Commercial Club of Louisville at a luncheon at the Seelbach, Louisville, a short time ago, the visitors being transported by the Louisville & Southern Indiana Traction Company in a special car.

**Traffic Figures in New York.**—In a report made by the Public Service Commission of the First District of New York showing the total number of tickets sold on the elevated and subway lines in New York City in the year ended June 30 last, the statement is made that 268,962,115 tickets were purchased for the subway and 293,826,280 for rides on the four elevated lines. The report shows that 30,531,969 more tickets were sold in the subway and 17,576,084 more on the elevated system than in the previous year. At the Brooklyn subway stations 32,476,087 tickets were sold, an increase of 5,392,645 for the year.

**Action Urged in Regard to Restoration of Transfers.**—Samuel J. Bloomingdale, of Bloomingdale Brothers, New York, N. Y., has sent a letter to the Public Service Commission of the First District of New York in which he urges that no further extension of time be granted in respect of the order of the commission which provides for the restoration of transfers between the Fifty-ninth Street line of the Central Park, North & East River Railroad and the lines of the Metropolitan Street Railway, which it intersects. The order has been extended by the commission to Nov. 1, 1910.

**Accident in New York Subway.**—A car of one of the south-bound express trains in the New York subway was derailed near the Fulton Street station on Oct. 20, 1910, about 5 p. m., and service below the Brooklyn Bridge and to Brooklyn was as a consequence suspended for about five hours. Traffic was for the time being diverted to the Brooklyn Bridge, and it was with great difficulty that the Brooklyn Rapid Transit Company and the Coney Island & Brooklyn Railroad were able to handle the crowds which were so suddenly forced to change from the avenues of travel that they customarily use to the routes over the bridge.

**Fender Ordinance in Trenton.**—Walter Madden, Mayor of Trenton, N. J., has signed the amendment passed by the City Council of Trenton recently to the ordinance compelling the use of fenders on street cars in Trenton, which ordinance was originally passed by the Council in 1903. Section 1 of the original ordinance is the part changed by the passage of the amendment. The amendment follows: "Section 1. That Section 1 of the ordinance entitled 'An ordinance to compel street railway companies owning and operating electric street railway cars within the city of Trenton to equip the same with fenders of the most approved pattern, approved May 6, 1903,' be and the same is hereby amended so as to read as follows: 'Section 1. That all street railway companies owning and operating electric street railway cars within the city of Trenton shall equip with and maintain upon each street railway car by them operated and run within the city of Trenton fenders of the most approved pattern, subject to the approval of the Mayor of the city, and so attach the same to the said cars as best to protect from injury persons and vehicles using the streets of the said city and riding on the said cars.' Section 2. All ordinances and parts of ordinances inconsistent herewith be and the same are hereby repealed."

## Personal Mention

**Mr. William Spalding**, formerly construction engineer with the Portland Railway, Light & Power Company, Portland, Ore., has been appointed general manager of the Tillanrook Electric Light & Fuel Company, Tillanrook, Ore.

**Mr. J. G. Swain** has resigned as superintendent of light and power of the St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., to become superintendent of motive power of the Cleveland, Painesville & Eastern Railroad, Willoughby, Ohio.

**Mr. George Westinghouse** is the subject of an appreciative article in the New York daily *Tribune* for Oct. 23, 1910, in which an account is given of his latest invention, that of a pneumatic cushion for automobiles, to eliminate the necessity of pneumatic tires.

**Mr. J. H. M. Andrews**, whose appointment as assistant to the chief engineer of the Philadelphia Rapid Transit Company was mentioned in the *ELECTRIC RAILWAY JOURNAL* of Aug. 27, 1910, has been appointed superintendent of lines and cables of the Philadelphia Rapid Transit Company. Mr. Andrews takes the place made vacant by the death of the late James Heywood.

**Col. E. C. Spring** has been appointed assistant to the president of the Lehigh Valley Transit Company, Allentown, Pa., in charge of traffic. Col. Spring was formerly general superintendent of the Dayton, Covington & Piqua Traction Company, Dayton, Ohio. Before becoming connected with the Dayton, Covington & Piqua Traction Company in 1902, Col. Spring was superintendent of the Newton & Boston Street Railway and the Wellesley & Boston Street Railway. Col. Spring was also president of the New England Street Railway Club and the Central Electric Railway Association.

**Mr. Leslie R. Coffin**, who has been acting manager of the Whatcom County Railway & Light Company, Bellingham, Wash., since the appointment of Mr. L. H. Bean as manager of the Tacoma Railway & Power Company, Tacoma, Wash., has been appointed manager of the Whatcom County Railway & Light Company. Previous to his appointment as acting manager of the Whatcom County Railway & Light Company to succeed Mr. Bean, Mr. Coffin held the position of electrical engineer of the company for about three years. He went to Bellingham direct from the home office of Stone & Webster, Boston, Mass., where he had been in the service of that company for a year, having entered its office after his graduation as electrical engineer from Harvard, 1906.

**Mr. E. H. Mather** has become associated with the bond department of Hayden, Stone & Company, bankers and brokers, New York and Boston, as the expert in street railway, water power, gas and electric light securities. Until recently Mr. Mather was general manager of the Nassau Light & Power Company, Mineola, N. Y. He served his engineering apprenticeship with the Thomson-Houston Company and entered the service of the General Electric Company after the consolidation. In 1895 he left that company to become superintendent of the Fair Haven & Westville Railroad, New Haven, Conn. After similar connections with the Central Railway & Light Company, New Britain, Conn., and the Portland (Maine) Electric Lighting Company he became in 1907 general manager of the Nassau Light & Power Company.

**Mr. George F. Reed**, division superintendent of the Springfield (Mass.) Street Railway, has been appointed superintendent of transportation of all the lines included in the Springfield system, a new department just created by the company. Mr. Reed will continue in the capacity of division superintendent as heretofore, with offices at North Main Street and Carew Street, Springfield. In his new position Mr. Reed will have jurisdiction over all interests pertaining to transportation on the lines embracing Springfield, Westfield and Palmer. Mr. Reed entered the service of the Springfield Street Railway in 1882 as a clerk. He was appointed electrical superintendent of the company in 1890 and foreman of transportation in 1895. In 1905 he was appointed superintendent of transportation of the Springfield division of the company, and continued in this capacity until his recent appointment as superintendent of transportation of all lines of the company.



# Construction News

## RECENT INCORPORATIONS

**\*Carnesville (Ga.) Railway.**—Chartered in Georgia to build a 20-mile electric railway to connect Toccoa, Carnesville, Mize and Red Hill. Capital stock, \$200,000. Incorporators: W. S. Erwin, J. H. Hicks, E. S. Hunnicull, G. W. Edwards, G. W. Davis, J. C. Andrews, H. H. Parker, W. R. Whiting, W. P. King and J. R. Hall.

**Alton & Mississippi Belt Railway & Transportation Company, Chicago, Ill.**—Application for a charter has been made in Illinois by this company to build an electric railway from a point in St. Clair County on the eastern inner harbor line of the Mississippi River, opposite St. Louis, through St. Clair and Madison Counties to Alton. Capital stock, \$25,000. Headquarters, Chicago. Incorporators: John W. Bissell, Julius H. Quasser, Henry L. Stern and Herbert J. Feinberg, all of Chicago.

**\*Bogalusa Public Service Company, Bogalusa, La.**—Incorporated in Louisiana to build and operate electric railways in and around Bogalusa. Capital stock, \$500,000. Incorporators: C. W. Goodyear, Jr.; J. K. Breeden and C. J. Wade.

**\*Omaha & Western Iowa Traction Company, Pierre, S. D.**—Incorporated in South Dakota to build a 90-mile electric railway to connect Omaha, Neb.; Council Bluffs, Ia., and Pierre, S. D. Capital stock, \$250,000. Headquarters, Pierre, S. D. Incorporators: C. E. Brown, M. E. Gallitan, G. Desmond McDonough, Daniel J. Avery, Chicago, Ill., and James S. Sebrer, Pierre, S. D.

**Dallas (Tex.) Traction Company.**—Incorporated in Texas to build street and interurban railways. Capital stock, \$10,000. Incorporators: E. L. Lancaster, J. B. Martin, R. A. Graves and W. G. Siler. [E. R. J., Feb. 19, '10.]

## FRANCHISES

**Lodi, Cal.**—The Central California Traction Company, San Francisco, has been granted a franchise by the Council to build its tracks on certain streets in Lodi.

**Marysville, Cal.**—The Northern Electric Railway, Chico, has been granted a franchise by the City Council to extend its tracks in Marysville.

**South Pasadena, Cal.**—The Pacific Electric Railway, Los Angeles, has been granted a 37-year franchise to double-track some of its lines in South Pasadena.

**New Haven, Conn.**—L. M. Daggett, representing the Shore Line Electric Railway, has asked the Board of Aldermen for the right to build its tracks in New Haven in accordance with its franchise rights.

**\*Albany, Ga.**—C. W. Rawson and associates have asked the City Council for a franchise to build an electric railway over certain streets in Albany.

**Council Bluffs, Ia.**—The Omaha & Council Bluffs Street Railway, Omaha, Neb., has asked the Council for a franchise to extend some of its lines in Council Bluffs.

**Shreveport, La.**—It is stated that the Shreveport Traction Company will ask the City Council for a franchise to build an extension of its Southern-Fairfield Avenue line in Shreveport.

**Baltimore, Md.**—The United Railways & Electric Company, Baltimore, has been granted a franchise by the City Council to extend its tracks in Baltimore. The company will ask the Public Service Commission for approval of this franchise.

**Kansas City, Mo.**—The Metropolitan Street Railway has been granted permits by the Board of Public Works to double-track its line from Broadway to Wyandotte Street in Kansas City.

**Morristown, N. J.**—The Morris County Traction Company has been granted a franchise by the Board of Aldermen to extend its tracks in Morristown around the park, down Morris Street to Spring Street, from there a double track to Washington's headquarters, and then by private right-of-way beyond the town limits.

**Baldwinsville, N. Y.**—The Syracuse, Lake Shore & Northern Railroad, Syracuse, has been granted a franchise by the Village Board to double-track its line through Syracuse Street, in Baldwinsville.

**Hamilton, Ohio.**—The Cleveland, Barberton, Coshocton & Zanesville Railway, Cleveland, has asked the County Commissioners for a franchise to build its railway over certain streets in Hamilton. This proposed railway will connect Cleveland and Zanesville, via Elyria, Barberton, Oreville, Millersburg and Coshocton. J. J. Breitinger, president. [E. R. J., Oct. 22, '10.]

**Salem, Ore.**—The Oregon Electric Railway, Portland, has been granted a franchise by the City Council to build its tracks over certain streets in Salem.

**Spokane, Wash.**—The Spokane Traction Company has been granted a franchise by the Council to build four extensions of its tracks in Spokane.

**\*Delavan, Wis.**—Hamilton Brown, Delavan, has been granted a franchise by the Board of Supervisors to build an electric railway in Delavan.

**Madison, Wis.**—The Chicago & Wisconsin Valley Railway has been granted a franchise by the Common Council to build an electric railway in Madison. This proposed line will connect Madison and Wausau via Portage, Janesville and Merrill. Allen T. Russell, Chicago, Ill., general manager.

## TRACK AND ROADWAY

**Phoenix (Ariz.) Railway.**—It is reported that this company has begun work on the extension of its tracks from Lincoln Place to Orangewood.

**Hot Springs (Ark.) Street Railway.**—This company reports that it will soon build a mile extension to its South Hot Springs line.

**Eureka Springs Electric Company, Little Rock, Ark.**—This company has recently been taken over by the Eureka Springs Company, and it in its turn took over the road formerly known as the Citizens' Electric Company, which is in the hands of receivers. Adolph M. Barron, Eureka Springs, secretary. [E. R. J., March 5, '10.]

**\*Westminster, B. C.**—It is reported that the Board of Trade is considering plans for building an electric railway to connect Westminster and Ladner.

**Northern Electric Railway, Chico, Cal.**—This company has awarded the contract to the Mississippi Valley Bridge Building Company, Leavenworth, Kan., for the construction of the foundations of the M Street bridge in Sacramento across the Sacramento River. The Vallejo & Northern Railway is also interested and included in the contract. According to the contract, the M Street bridge will have a single railway track, two driveways and two sidewalks. It will have two fixed spans of 125 ft. in length and a draw of 400 ft.

**Oakland & Antioch Railway, Oakland, Cal.**—It is reported that this company has resumed the work of grading on its line between Bay Point and Lafayette, the contract for which has been awarded to the Bay Point Construction Company. An 80-ft. bridge will be built across the Grizzly Creek, near Lafayette.

**Porterville (Cal.) Northeastern Railway.**—This company has completed survey and secured the necessary capital for constructing its proposed 18-mile electric railway along the north bank of the Tule River in Porterville. Contracts for building are to be let at once. C. S. Freeland, Porterville, chief engineer. [E. R. J., Oct. 8, '10.]

**California Midland Railroad, San Francisco, Cal.**—This company is said to have been successful in selling its bonds and that construction work will be soon resumed on its railway to connect Hammonton, Grass Valley and Marysville. The roadbed between Marysville and Hammonton was partially constructed two years ago. The line as planned will connect Marysville, Grass Valley, Nevada City and Auburn, a distance of 70 miles. John Martin, 708 Alaska Commercial Building, San Francisco, president.

**Shore Line Electric Railway, New Haven, Conn.**—This company has filed plans for the extension of its line from Guilford and North Branford through the Totoket and Foxen regions across the meadows, crossing the Quinnipiac River and tapping the Connecticut company's line at State Street and Ferry Street in New Haven.

**Southern Traction Company of Illinois, East St. Louis, Ill.**—This company has resumed construction of its 30 miles

of railway between St. Louis, East St. Louis and Belleville. It will connect with the St. Louis Municipal Free Bridge in St. Louis. About half of the grading is finished and some track laid in East St. Louis and Belleville. The East St. Louis Engineering Company, Cahokia Building, East St. Louis, is engineer for the East St. Louis and St. Louis end and Harper Brothers, East St. Louis, are engineers for the Belleville section of the line.

**\*Brazil, Ind.**—It is reported that plans are being made to build a proposed electric railway to connect Jasonville and Brazil via Clay City.

**\*Indiana Electric Transmission Company, Evansville, Ind.**—It is said that this company is planning to build an electric railway from Terre Haute to Clay City, and that it has completed surveys.

**Evansville, Mount Carmel & Olney Electric Railway, Evansville, Ind.**—This company is said to have begun work on its 65-mile interurban railway to connect Mount Carmel, Highland, Darmstadt, Cynthiana, Owensville, Friendsville, Lancaster, Berryville and Olney. E. Q. Lockyear, secretary. [E. R. J., July 2, '10.]

**Tri-City Railway, Davenport, Ia.**—This company has awarded to the McCarthy Improvement Company, Davenport, the contract for grading for the extension of its Twenty-seventh Street line in Davenport.

**\*Winnipeg, Salina & Gulf Railway, Salina, Kan.**—This company, it is reported, proposes to construct an electric railway from Omaha, Neb., via Oak to Chester, thence to Belleville, Kan., and then to Salina, Sterling and Pratt, Kan., thence to Alva, Okla.; Fairview, Okeene and Oklahoma City. Other branch lines will be run from Salina to Kansas City, Mo., and from Alva, Okla., to Des Moines, N. M. The W. K. Palmer Company, Engineers, 717-720 Dwight Building, Kansas City, Mo., will make all surveys and have charge of all the engineering work.

**Berkshire Street Railway, Pittsfield, Mass.**—This company is said to be considering plans to extend its Briggsville line through to Wilmington, Vt., via Stamford, Hartwellville and Readsboro.

**Gulfport & Mississippi Coast Traction Company, Gulfport, Miss.**—This company reports that it is now building about 2 miles of new track in Gulfport.

**\*St. Louis, Mo.**—Charles F. Dollas, representing the Gratiot & Lindenwood Improvement Association, and associates are considering plans for building an independent street railway in St. Louis to extend from South Broadway to the suburbs of Greenwood and Maplewood.

**Omaha & Council Bluffs Street Railway, Omaha, Neb.**—This company has completed and placed in operation its Twenty-fourth Street extension, thereby connecting South Omaha and Florence.

**Elmira, Corning & Waverly Railroad, Elmira, N. Y.**—This company has awarded the contract to the Powers & Mansfield Company for the grading and masonry for 10 miles of track from Elmira to Waverly. It has also awarded a contract to Smith-McCormick Company, Easton, Pa., for the construction of a new iron bridge across the Chemung River, 3 miles from Corning.

**Hornell (N. Y.) Traction Company.**—This company reports that during the next few weeks it will rebuild its tracks on some of the streets in Hornell.

**\*Manchester, N. Y.**—The Manchester Improvement Company, Manchester, is said to be considering plans for building an electric railway to connect Manchester, Geneva, Clifton Springs, Port Gibson, Palmyra and Manchester. Surveys have already been completed. This new line would connect with the Rochester, Syracuse & Eastern Railway at Geneva and with the Syracuse & Eastern Railway at Palmyra.

**New York, Westchester & Boston Railway, New York, N. Y.**—This company has been authorized by the Public Service Commission, Second District, to exercise franchise granted for the construction of its railroad within Mount Vernon, New Rochelle, North Pelham, Eastchester, Scarsdale and White Plains.

**Auburn & Syracuse Electric Railroad, Syracuse, N. Y.**—This company is straightening its line between Syracuse and Auburn. The new route will save one mile and reduce

the running time between the cities many minutes, being practically a straight line between Skaneateles and Auburn.

**Cleveland, Barberton, Coshocton & Zanesville Railway, Cleveland, Ohio.**—The stockholders of this company at a meeting in Cleveland on Oct. 22 voted to increase the capital stock from \$100,000 to \$2,000,000 and also to issue \$1,900,000 40-year 6 per cent gold bearing bonds. The bonds, it is said, will be taken by London and Montreal bankers. The financial arrangements thus made will enable the company to build that portion of the line between Cleveland and Orrville and put it into operation. A. De Mayo & Co., Montreal, have been awarded the contract for building this railway and will begin work about Nov. 1. More than 190 miles of private right-of-way have been secured and the surveys have covered 275 miles. A franchise for the use of about 8 miles of the county road in South Brooklyn and south of that point is being sought from the Cuyahoga County Commissioners. J. J. Breiting, president [E. R. J., Oct. 22, '10.]

**\*Ponca City, Okla.**—Messrs. B. Steward and Frank Hatten, Ponca City, are said to have made preliminary arrangements and secured the necessary capital for building a street railway in Ponca City. They will soon apply for a charter.

**Ottawa, Rideau Valley & Brockville Railway, Ottawa, Ont.**—This company announces that it will begin work at once building its proposed 60-mile railway from Ottawa to Brockville. Andrew Haydon, president. [E. R. J., Oct. 1, '10.]

**Cumberland Railway, Carlisle, Pa.**—It is said that this company will soon build a 22-mile extension of its railway from Newville to Shippensburg.

**Clarion & East Brady Electric Railway, Clarion, Pa.**—This company reports that it is ready to award contracts for grading 30 miles of roadbed. This proposed railway will connect Clarion, Reidsburg, Sligo, Rimersburg and East Brady. G. C. Arnald, Clarion, president. [E. R. J., Oct. 22, '10.]

**Scranton & Binghamton Traction Company, Scranton, Pa.**—This company has filed for record at Wilkes-Barre a mortgage in favor of the Anthracite Savings Bank, Wilkes-Barre, as trustee to secure an issue of \$10,000,000 of 6 per cent bonds, dated June 1, 1910. This proposed 62-mile electric railway will connect Franklin Forks, Lausville, Corbettsville, Conklin, Brooklyn, Lindaville, Montrose and Binghamton. A viaduct will be built over the Delaware, Lackawanna & Western Railroad tracks at Montrose. The final surveys for the railway are now in progress. W. L. Connel, Scranton, president. [E. R. J., March 5, '10.]

**Wilkes-Barre (Pa.) Railway.**—This company is said to have begun work on the extension of its railway from Hughestown to Avoca. It is planned to complete this line and to place it in operation before January, 1911.

**\*Williamsport, Pa.**—Messrs. James Fisher and Oliver Berger are said to be surveying for a route for an electric railway from Antes Fort through the Nippenose Valley.

**Amarillo, Tex.**—It is reported that preliminary arrangements have been made and construction has begun on a proposed 2-mile electric railway to be built from Amarillo to San Jacinto Heights. N. A. Brown is interested. [E. R. J., Aug. 25, '10.]

**Galveston-Houston Electric Railway, Houston, Tex.**—This company is said to have laid 10 miles of track between Texas City Junction and League City. This proposed 50-mile railway will connect Galveston and Houston. [E. R. J., July 2, '10.]

**Nooksack Valley Traction Company, Bellingham, Wash.**—This company, it is said, has made preliminary arrangements for building its proposed electric railway to connect Bellingham and Sumas. Samuel Alsop is interested. [E. R. J., Jan. 29, '10.]

**Spokane & Inland Empire Railroad, Spokane, Wash.**—It is reported that this company will build a 2-mile extension of its railway from its present terminus at Cleveland Avenue and Elm Street to the Boulevard Park addition in Spokane.

## SHOPS AND BUILDINGS

**Northern Electric Railway, Chico, Cal.**—It is reported that this company is considering plans for building a passenger depot on the corner of Myers Street and Robinson Street and a freight depot on Huntoon Street and Robinson Street in Oroville.

**Evansville Suburban & Newburgh Railway, Evansville, Ind.**—This company advises that it is now building a new fireproof freight depot in Evansville.

**Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.**—This company, it is said, will remodel its machine shop into a passenger, freight and car house. The structure will be one story, 60 ft. x 120 ft., of brick construction. The cost is estimated to be about \$5,000.

**Central Kentucky Traction Company, Frankfort, Ky.**—This company is said to be considering plans for building a station at Versailles, Ky.

**Michigan United Railways, Lansing, Mich.**—This company is erecting a terminal building and train shed at Jackson. The new terminal will have an arcade entrance on one of the main business streets and the train shed in the rear of the terminal building will be a block long, enclosing two tracks. It is expected that the terminal will be completed by Nov. 15.

**Butler (Pa.) Passenger Railway.**—It is reported that this company is considering plans for building an extension to its car house in Butler. The addition will be 60 ft. x 100 ft. It will have a capacity for sheltering nine of the larger cars and will be used largely for storage, painting and repair work.

**Hull Electric Company, Deschenes, Que.**—This company reports that it will build a new car house and repair shops in Deschenes next Spring.

## POWER HOUSES AND SUBSTATIONS

**Arkansas Valley Interurban Railway, Wichita, Kan.**—This company has completed its new substation at Valley Center and the machinery for the plant is being installed.

**Pittsfield (Mass.) Electric Street Railway.**—This company is now installing a new system for furnishing power for its lines out of Pittsfield, and when completed there will be sufficient power to meet all requirements. It has awarded the contract to Ley & Company for building a new substation at Cheshire, from which power will be transmitted over the Cheshire line out of Pittsfield as far as Lanesboro, and also over the Dalton and Hinsdale line from Coltsville to Hinsdale. New feed wires are being strung from the power station on Seymour Street, Pittsfield, to supply additional power on the West Pittsfield line.

**Meridian (Miss.) Light & Railway Company.**—This company has let the contract for the construction of an addition to its boiler house in Meridian. It will install a 500-hp. Babcock & Wilcox boiler.

**Boston & Maine R. R., Concord & Manchester Electric Branch, Concord, N. H.**—This company advises that it has now in progress under contract with the Stone & Webster Engineering Corporation the development of its new water-power plant at Franklin, N. H.

**Oakland Street Railway, Dayton, Ohio.**—This company is said to be considering plans for relocating and enlarging its power plant.

**Trenton, Bristol & Philadelphia Street Railway, Bristol, Pa.**—This company advises that it now has in course of erection a bulkhead and wharf, 50 ft. x 100 ft., at its power plant on the Neshaminy Creek, Bridgewater, for the purpose of unloading coal, which it expects to have shipped by water instead of by rail. Barges of 250 tons capacity will be unloaded by a derrick and clamshell apparatus. The estimated cost of construction, including the engine and derrick, will be about \$1,800. William H. Murphy, superintendent.

**Holmesburg, Tacony & Frankford Electric Railway, Tacony, Pa.**—This company reports that during the next two weeks it will let contracts for building an addition to its boiler house in Tacony. Henry Glazier, general superintendent.

**Manufactures & Supplies**

## ROLLING STOCK

**International Transit Company, Sault Ste. Marie, Ont.,** is considering the purchase of three closed trailers.

**Great Falls & Dominion Railroad, Washington, D. C.,** is reported to be considering the purchase of several cars.

**Illinois Traction System, Peoria, Ill.,** has ordered 50 coal cars and 25 box cars from Haskell & Barker and 35 trailer express cars from the McGuire-Cummings Manufacturing Company.

**Richmond & Henrico Railway, Richmond, Va.,** reported in the *ELECTRIC RAILWAY JOURNAL* of Aug. 27, 1910, as planning to purchase 16 cars, has ordered 12 closed cars from the Southern Car Company.

**Second Avenue Railroad, New York, N. Y.,** mentioned in the *ELECTRIC RAILWAY JOURNAL* as being in the market for 200 new railway motor equipments, has ordered 200 equipments of No. 216 interpole motors from the General Electric Company.

**Beaumont Traction Company, Beaumont, Tex.,** has ordered three semi-convertible double-truck pay-within cars from the American Car Company. The car bodies are 25 ft. 4 in. long and the length over all is 37 ft. 4 in. They are equipped with Brill 27 G1 trucks, G. E.-67 motors and type A4 National air brakes.

**Portland Railway, Light & Power Company, Portland, Ore.,** reported in the *ELECTRIC RAILWAY JOURNAL* of Sept. 17, 1910, as contemplating the purchase of 40 additional cars, has ordered 25 28-ft. 8-in. pay-as-you-enter cars and 15 31-ft. 6-in. pay-as-you-enter cars from the American Car Company. The cars will be mounted on Brill No. 22E trucks.

**Central Park, North & East River Railroad, New York, N. Y.,** which has been operating horse cars on a number of its lines, has practically concluded negotiations with the Federal Storage Battery Car Company for 10 Beach storage-battery cars similar to the car now in service on the Twenty-eighth and Twenty-ninth Streets Crosstown Railroad, New York.

**Michigan United Railways, Jackson, Mich.,** has several equipment orders under way. The J. G. Brill Company will soon ship to this company 30 double-truck city cars, 41 ft. long over all. A portion of these bodies will be equipped with McGuire-Cummings Company No. 10-A trucks. The platforms will be adapted for the use of the pay-on-platform fare-collecting system. All of the new city cars will be equipped with Hale & Kilburn seats and Allis-Chalmers air brakes. Within the next month the company expects to receive from the McGuire-Cummings Manufacturing Company a new office car for its interurban system. This car will have a complete office equipment, an observation end, sleeping apartments, kitchen and dining room. Other rolling stock equipment recently ordered includes a McGuire-Cummings gravity street sprinkler with a capacity of 3000 gal. for the Jackson city lines and two snow sweepers of the same manufacture with steel underframes to be used in Jackson and Lansing. The General Electric Company is furnishing the Michigan United Railways with four G. E. 216 2-motor car equipments and 10 G. E.-210 2-motor equipments.

## TRADE NOTES

**Edward V. Kane & Company, Philadelphia, Pa.,** bankers, have dissolved and a new firm of the same name has been formed, with offices at 610 Morris Building.

**H. H. Curran,** of the firm of Curran & Mead, New York, N. Y., is a candidate for Congress on the Republican and Independence League tickets in the Eleventh Congressional District in New York.

**Bird-Archer Company, New York, N. Y.,** has appointed G. Fred Collins as special representative with office in New York. Mr. Collins was formerly connected with the Crucible Steel Company of America.

**American Car & Foundry Company, New York, N. Y.,** will erect a one-story addition, 72 ft. x 100 ft., to its plant at Wilmington, Del. The new structure will be of steel and concrete and will cost, it is estimated, \$8,550.

**Peter Smith Heater Company, Detroit, Mich.**, has delivered the first installment of 10 Peter Smith hot-air heaters to the Public Service Railway, and 4 hot-air heaters to the North Jersey Rapid Transit Company.

**United States Metal & Manufacturing Company, 165 Broadway, New York, N. Y.**, has taken the exclusive agency for the electric railway field in the United States for the axles (including the Cunningham axle) manufactured by the Carbon Steel Company.

**Malcolm Brake Shoe Company, Charleston, W. Va.**, has been incorporated with a capital stock of \$25,000 to manufacture brake shoes. The incorporators are: C. A. Malcolm, Mindon, W. Va.; T. Mairs, S. B. Avis, Walter Hardy and A. E. Scherr, Charleston.

**Gisholt Machine Company, Madison, Wis., and Joseph T. Ryerson & Son, Chicago, Ill.**, announce an association of interests in the manufacture and sale of machinery and machine tools. Extensive additions will be made at once to the Gisholt plant to increase the output of that company.

**Wesco Supply Company, St. Louis, Mo.**, is erecting a new building at Eighth Street and Clark Avenue, St. Louis, which will be a duplicate of its present building at Seventh Street and Clark Avenue. The company will occupy both structures, thus giving it double the amount of floor space that it has at present.

**Baldwin Locomotive Works and Standard Steel Works Company, Philadelphia, Pa.**, have appointed C. H. Peterson Southwestern representative, with offices at 914 Security Building, St. Louis, Mo. Mr. Peterson was formerly connected with the Chicago office of these companies. Edward B. Halsey, who has been in charge of the St. Louis office, has been transferred to the sales department of the Philadelphia office.

**Railway Equipment Company, Portland, Ore.**, which is a jobber and manufacturer's agent for all kinds of steam and electric railway equipment and supplies, is preparing to issue a general railway supply catalog. Manufacturers of railway supplies are invited to furnish illustrations, descriptive matter and stock lists of their goods for insertion in this general catalog or to send copies of their own catalogs from which the information required may be abstracted.

**American Brake Company, St. Louis, Mo.**, has awarded a contract to Westinghouse, Church, Kerr & Company, New York, N. Y., for building and equipping an additional machine and blacksmith shop and for making other improvements at the company's plant at St. Louis. The machine shop will be constructed of steel, concrete and hollow brick, will be three stories high and will cover an area of 13,000 sq. ft. The blacksmith shop will have the same dimensions, but will be only one story high.

**Robert W. Hunt & Company, Chicago, Ill.**, have taken over the entire equipment of an electrical testing laboratory with a view to improving and enlarging their facilities. The following is a partial list of the investigations which this company is prepared to make: Insulation tests of wires and cables; resistance and conductivity tests; insulation of completed systems; calibration of instruments; life and photometric tests of lamps; location of faults in power and telephone cables; efficiency tests of motors, generators and transformers; location and prevention of electrolysis.

**Northern Engineering Works, Detroit, Mich.**, are completing an addition to their crane-erecting shop, approximately 160 ft. x 60 ft., of fireproof structural steel and brick construction and having steel sash. Three cranes and two overhead trolley runs will serve the floor. Electric and pneumatic hoists will be used. The machinery has been installed and the building will soon be occupied. A new storage yard for structural steel has been laid out alongside the addition and is covered by a 60-ft. span, three-motor electric Northern gantry crane of special construction.

**Federal Storage Battery Company, New York, N. Y.**, reports that it is completing a practically all-steel 28-ft. double-truck car for the South Shore Traction Company to be operated over the Queensboro Bridge from Long Island to New York City. It also reports the receipt of a letter from the Atlantic City & Shore Railroad, on whose line its single-truck car was run during the convention. The car

ran on South Carolina Avenue, between the Boardwalk and Atlantic Avenue. On Oct. 15 between 1 p. m. and 5 p. m. it made 36 trips and 93 stops, carried 266 passengers and showed a consumption of exactly 5 kw-hours. This corresponds to an average consumption per car mile of 0.347 kw-hour, and per ton mile of 54.2 watt-hours. The car speed, including all stops, was 9 m.p.h. The letter concludes with a statement from John N. Akarman, general superintendent of the Atlantic City & Shore Railroad, saying that "the car referred to was operated at all times while on our lines without the least difficulty; its acceleration and performance generally were perfect, and I wish to congratulate you on the production of such a splendid and adaptable car."

#### ADVERTISING LITERATURE

**Holland Trolley Supply Company, Cleveland, Ohio**, is mailing a circular describing and illustrating the Holland sleet cutter.

**Wickes Brothers, Saginaw, Mich.**, have issued their October monthly stock list of boilers, engines, pumps, machine tools, electrical machinery, etc., which they have on hand for immediate shipment.

**Goldschmidt Thermit Company, New York, N. Y.**, has issued a 16-page catalog in which the various applications of thermit to rail welding are described. Attention is also called to the repairing of motor cases and truck frames by the thermit process.

**Wesco Supply Company, St. Louis, Mo.**, is distributing its general supply catalog No. 150. It covers every department of the electrical industry, including general supplies, a complete line of street railway material, electrical novelties and ignition apparatus and supplies. The publication contains about 1,400 pages.

**C-A-Wood-Preserver Company, Austin, Tex.**, is mailing a circular calling attention to the fact that the recent forest fires in the West destroyed more than \$25,000,000 worth of uninsured timber and that in the year 1908 more than \$50,000,000 was spent for replacing ties which were uninsured against rot destruction. The company also discusses the value of the C-A-wood preserver.

**Titanium Alloy Manufacturing Company, Pittsburgh, Pa.**, has issued a 22-page pamphlet entitled "Titanium in Iron." This alloy may be used through the cupola or through the air furnace to be melted down with the charge, making it more simple and practicable for ordinary use than the ladle method, where the alloy may also be used. The publication contains directions for using titanium in machinery castings, gray iron castings, malleable iron, chilled rolls and chilled iron car wheels.

**The J. G. Brill Company, Philadelphia, Pa.**, in the October issue of the *Brill Magazine* prints the following articles: "Conditions Which Govern the Type of Car for City Service—Richmond, Va.," "Motor Car for the Southern Railway," "Private Car for C. D. Beebe," "Single-Truck Cars for Dayton, Ohio," "Equipment for Citizens' Railway, Waco, Tex.," and "Exhibition Car at A. S. I. R. A. Convention." The subject of the biographical sketch in the October issue is James F. Shaw, past-president of the American Street & Interurban Railway Association. As a supplement to the present issue the magazine contains an illustrated description of the Brill exhibition at the 1910 Atlantic City convention.

**General Electric Company, Schenectady, N. Y.**, has recently issued Bulletins 4766, 4769, 4771, 4773, 4775 and 4776. Bulletin 4766 describes and illustrates tantalum incandescent lamps for general illumination. Bulletin No. 4769 is entitled "Train Lighting with G. E. Mazda and Tantalum Lamps." Bulletin No. 4771 is entitled "Hand-Operated Starting Compensators for Alternating Current Motors" and supersedes previous bulletins on this subject. Bulletin No. 4773 describes and illustrates Thomson high torque induction test meter, type 1B-4. Bulletin No. 4775 describes and illustrates type K3 single-phase induction motors. This motor is made in capacities of from 1 to 15 hp and wound for 110 or 220 volts, 60 cycles. Bulletin No. 4776 illustrates and describes engine type continuous current generators, forms RB and RBC for lighting and power. These generators are for two and three-wire systems, from 25 to 250 kw and for standard voltages.