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## EDITORIAL NOTICE

Street railway news, and all information regarding changes of officers, new equipments, extensions, financial changes and new enterprises will be greatly appreciated for use in these columns.

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## The Purchase of Railway Equipment

One of the most striking indications of the change which has been effected in street railway methods during the past ten years is in the way of contracting for equipment. The time is not so very far distant, measured in years, when the placing of orders depended largely upon the plausibility and oratory of the salesman for the different "systems." The agent who could make out the best story for his motor and show the longest list of references, could exploit the advantages of his particular system and could expose the drawbacks of those of the other fellow, was the one to get the contract. From an engineering standpoint he might know very little or nothing as to the practical features of the apparatus he was selling, but if he made out the best case he got the order.

At that time the qualifications of good apparatus were not so thoroughly understood by either the manufacturer or the purchaser, especially the latter, as they are at present. But with an increase of knowledge as to the science of electric railways the days of the former "agent" have passed and the best salesman now is an engineer, who can discuss the fine points of construction and design and who knows the theory of the apparatus which he is selling. The reason for the change is

that the purchaser has grown wiser and insists upon a knowledge of the possible performance of the apparatus which he is proposing to use before making his selection.

This change in purchasing methods has been evinced in perhaps as striking a way as ever, in the recent order for motors placed by the Interborough Rapid Transit Company, and this can be referred to here without prejudice from the fact that the order was equally divided between the two manufacturers of railway motors in this country. The series of tests made by the engineers of the Interborough Rapid Transit Company was very complete and extended over seven weeks actual work on the road besides that given in the shops of the manufacturers. An outline of the tests conducted is published elsewhere in this issue, and shows that all the salient factors in motor performance were considered by the engineers in charge of this important order. Whatever the results may be, the owners of the road should feel satisfied that so far as a preliminary examination is concerned no pains were spared to determine the adaptability of the motors to all conditions of the work which will be met in subway operations.

We do not mean to say that an elaborate series of tests such as these have been is practicable or even advisable in the case of all purchases of electrical equipment. The expense to both railway company and manufacturers would make such a plan prohibitive. Nevertheless, such a combination of tests as has been carried out by the Interborough Rapid Transit Company cannot fail to be of benefit to the industry in general, partly on account of the effect on the manufacturers and partly from the standards set for railway apparatus, which can be insisted upon by other companies purchasing the same type of motors.

## Electric Railways and Common Carriers in Massachusetts

The controversy over proposed legislation in Massachusetts "to authorize the Fitchburg & Leominster Street Railway Company to act as a common carrier between the town of Lunenburg and the city of Fitchburg," brought up very prominently the whole question of granting to electric railways privileges and rights under proper restrictions that will place them upon a common footing with steam railroads. The act in question was vetoed by Governor Bates, because of his objection to special legislation, and not through opposition to the general principle of the bill, and it is fair to assume that his action, while serving as a temporary check to the development of a particular property, is on the whole much more beneficial to the industry at large than his approval of the measure in question would have been, as it has prepared the way for the enactment of a general law governing the granting of franchise rights to electric railways throughout the State that will make them common carriers.

Governor Bates' attitude is explained very clearly in his message vetoing the Fitchburg bill: "I do not object to street railways acting as common carriers of parcels, baggage and certain classes of freight whenever the public convenience may be promoted thereby," he says, "but I am opposed to the unnecessary multiplication of special acts granting special privileges." Nine special bills of this character were enacted last

year, since 1890 seventy such bills have become law, and many petitions for similar special legislation are pending at the present time. These facts he considers as conclusive evidence that a general law is needed and that special legislation of this character should be checked. The Governor declares that the local authorities are best qualified to determine whether or not the conditions in their respective communities require the granting of such privileges, and he has accordingly suggested the enactment of a general law giving street railway corporations the rights in question wherever they have obtained the consent of the local authorities, together with the approval of the Board of Railroad Commissioners, after a public notice and hearing.

A bill embodying these features has been prepared and introduced in the Massachusetts Legislature, and will receive the support and approval of the Governor. Its enactment will doubtless prove of great advantage to the railway companies, provided they are not hampered by restrictions imposed by local authorities. Some provision should be made, if possible, to prevent a petty village board, for instance, from holding up a great public improvement, as has been done in many cases in order to exact conditions from the companies, that are neither reasonable nor just, but which are often insisted upon as a price for permission to pass through a village or town. Of course, this is simply official blackmail, and it has been practiced so much in some sections of the country that builders of electric railways would welcome any form of relief from the extortionate demands of petty town councils. In the Massachusetts movement care should be taken to provide for some higher authority than a village board to fix terms and conditions in case an agreement cannot be reached by the local officials and the railway company.

The proposed legislation is welcomed throughout the State, as its enactment is expected to work directly to the advantage of the small shippers, the farmers and the merchants desiring to use the electric lines for parcel delivery, fast freight and short hauls generally. The new order of things should open up an entirely new field for the electric railway in Massachusetts, and we have no doubt that New England thrift will appreciate fully its opportunities.

### The Larger Railway Motor

The most interesting sizes of railway motor are perhaps those of 150-hp and 200-hp, partly because they represent the later developments of the art, and partly because the design is of necessity such that dangerous limits have been very closely approached. The external appearance of a 200-hp railway motor, such as has been adopted for the subway in New York, is impressive in this respect and inclines the engineer to speculate as to what expedient must be employed when larger powers are employed. This motor is the essence of compactness. Its bearings are inside its hollow armature and commutator. The bolts and nuts appearing on the ends of the motor are shaved as thin as mechanical caution will permit. Even one-eighth of an inch is valuable as clearance space and is figured upon, and the narrow confines of the master car builders' truck is rapidly becoming inadequate to accommodate the increasing bulk of the large motors which the application of electricity to heavy electric work is demanding.

The inside of one of these larger motors is a marvel of ingenuity. The field magnets and pole pieces are so compactly installed within the case that there is hardly a cubic inch of space to spare. Not the least interesting of these interior parts is the commutator with its broad, heavy brushes, clearing the

case by scarcely one-eighth of an inch, and the whole closely surrounded by iron walls. When it is realized that this device, strong and substantial as it is, is worked to the limit of its endurance, and that the margin between full working load and the flash-over point is very narrow, it becomes very interesting to speculate what methods will be employed to make the larger motors for trunk line work, which are certainly coming commercial machines. Railway motors at present do not stray far from repair shops where they can at least be inspected and cleaned, but trunk line motors have different duties to perform and must make longer runs, and that they must be of a more rugged character than any motors yet produced every railway engineer knows. On the other hand, trunk line motors are not so exacting with reference to their torque and speed curves. Their starts and stops are much less frequent and their requirements with reference to the transmission of power are much greater. It cannot be denied that, viewed from this light only, these considerations point to the ultimate adoption of a commutatorless alternating-current railway motor, if such can be made an electrical and mechanical success.

Another interesting speculation is called to mind by the existing conditions in steam railroading. Large locomotives, such as are adapted for long distance freight haulage or for high speed passenger work, are expensive machines to start and stop, whereas, for local traffic or for switch-yard work locomotives of a different design can be used. Assuming, then, a practical single-phase series motor, it does not seem impossible to conceive of a trunk line system employing polyphase motors for its high-speed long-distance service, and single-phase series motors for its suburban and yard work.

### Gasolene Cars

Trials will soon be made on several Western roads of cars driven with gasolene motors. This is not surprising, in view of the fact that the gasolene motor has attained such a degree of perfection for automobile propulsion, but there is no reason why stock in the large manufacturing companies making electric railway apparatus should decline as a result of this fact. We believe that even the most ardent advocates of electricity will admit that there is a portion of the transportation field which neither electricity nor steam has yet been able to cover with entire satisfaction. In small cities where the traffic would not be sufficient to justify an electric railway, and for interurban lines running through too sparsely settled a country to make advisable the construction of an electric road, there is room for some economical form of self-contained motor car which will not involve a heavy investment per mile for power station and transmission lines.

The proposition is not a new one by any means. For many years inventors have struggled to produce some independently driven type of street car, but so far with negative results. Steam roads have also struggled with this problem, and have attempted to build dummy motor cars for branch lines which would be less expensive in operation and maintenance than locomotives. Their efforts have been mainly expended in modifications of the steam dummy. For street car propulsion compressed air, storage batteries and gas engine have so far been found wanting. Whether the gasolene engine, with the development it has undergone the past few years for automobile work, can successfully fill the gap remains to be seen. There is no question but that the problem of producing a light gasolene-driven car for use on steel rails is less difficult than that of producing an automobile to run over rough pavements.

With the automobile problem successfully solved it seems as

if it should not be a difficult undertaking to adapt some gasolene motor and driving gear to the propulsion of light railway cars. The main question, although we are not prepared to say the only one, appears to be that of cost of repairs and maintenance. Gasolene automobile coaches are in daily use, hauling large numbers of people. Apparently the fuel consumed is low enough to be within the limits of commercial requirements. The gasolene motor, however, has a reputation of being a very "troublesome beast" as to repairs and breakdowns, assertions of its friends to the contrary notwithstanding; and it is noticeable that its friends pass lightly over this feature of the motor, just as in former days friends of the storage battery had little to say about cost of maintenance when advocating its use as a motive power on street railway cars. The cost of maintenance nothing but actual experience can determine; and we must wait with patience the result of trials extending over one or two years. It is but reasonable to suppose that the gasolene motor has been, or will be, as much improved in matters tending to lower the cost of repairs as was the electric street railway motor the first five years of its use.

Gasolene motors can never supplant electric cars for heavy railway traffic. The low cost of generating electric power and the inherent desirable qualities of the electric motor, make this unqualified assertion entirely safe. But the gasolene motor is to be welcomed if it can rush in to fill the light traffic field where investors in electric railway enterprises have feared to tread.

### Certain Phases of Consolidation

We have many times remarked upon the gains that come by the consolidation or affiliation of street railway companies operating in contiguous territory. The tendency to so consolidate has been very strong of late, and in nearly every instance the results have been good, in point of service at least. But, just as in the case of mergers in manufacturing properties, it by no means follows from the general success of such operations that they can be continued quite indefinitely. Even supposing that manufacturing plants are united in a careful and conservative manner, with no watering of stock or huge promotion expenses, it does not follow that the natural savings of a community in operation will insure a gain in net profits. Large organizations become unwieldy and are sometimes kept in alignment only by most complicated and troublesome methods. There is a tremendous opportunity for back-lash in a large concern of any kind, and it sometimes makes itself felt in a very unpleasant fashion. Even in a single great manufacturing plant it is quite possible to carry the sub-division of labor so far that the total cost of production goes up instead of down. There is a certain loss of directness, of personal responsibility that has a direct bearing on the operating expenses, and it is not always the biggest factory that turns out its product at the lowest price. A complicated auditing, purchasing and inspecting system eats up a certain amount of time and money that sometimes is in excess of all the saving accomplished.

Now, in street railway combinations there are immediate and excellent results in certain directions. The service by community of action can almost always be greatly improved. Through routes can be established, and to a certain extent a common use of rolling stock and general equipment can be maintained to the great advantage of the component roads. There can be free exchange of power to the material saving of cost in the feeding system, and several roads may be operated

from a common power house with substantial resultant saving. But the thing which we here wish to point out is that these savings cannot be continued indefinitely. There is a point beyond which rolling stock cannot be used in common to good advantage, beyond which employees cannot be charged with duties common to two or more roads, and beyond which it does not pay to furnish power from a common plant. We have a feeling that in this last particular there is just a strong tendency to overdo matters. To increase greatly the radius over which power is being distributed from a single station is costly in material and care, and it is very easy to reach a point beyond which it will not pay to go. One big station can, of course, be made to furnish power for a network containing several hundred miles of road, but to show a saving in so doing is a very different matter. We wish that an accurate census of costs in fairly large power stations could be taken, with a view of showing at what capacities and load factors the costs tend so far toward uniformity as to nullify the advantage to be gained by consolidation. We have a strong disposition to think that some well operated stations of moderate size would show operating costs very near the minimum.

There are other drawbacks, however, besides those relating to the equipment. We have especially in mind in this connection the increasing number of strikes by which street railways have been afflicted. During the last year strikes, without the existence of any especial predisposing cause, have been unpleasantly numerous. Not only this, but they have been notable for scenes of violence, and the atmosphere is uneasy with them. In case of a strike on a widely ramifying network of roads there is peculiar danger of disorder, the more difficult to suppress as it becomes harder to locate. Experience in general railway work has shown that it is practically impossible to get a general organization of employees that will be effective. Each line or group of lines has its own agitators, shrewd or vicious, as the case may be, and in a single system they can hold the men in striking order. And the bigger the system the more dangerous, troublesome and disastrous is the result. A network of friendly roads not under a single manager or responsible to a single governing board is, from the walking delegate's point of view, a difficult proposition. He cannot work up the men of every road to a simultaneous fighting appreciation of their alleged grievances, for they do not work for the same boss, and have local affairs of their own to attend to. Nor can he move them to declare sympathetic strikes on purely general grounds. So long as a move made anywhere on a large system will annoy the same company, moves will be plenty, but only the most evil and desperate class of strikers would go off their own road to attack a neighboring one merely because it was on a friendly basis of co-operation. On some scattered networks, as they now exist, half a dozen criminal strikers could keep every line crippled most of the time and not half try.

We do not mean that such a state of affairs necessarily occurs, but it is well to consider its possibility in connection with the general subject of consolidation. On the other hand, from a practical standpoint most of the valuable and material advantages of formal consolidation can be gained by community of interests and a judicious *modus vivendi*. Such an arrangement is equally effective in dealing with foes from without, and much more effective in dealing with foes from within. Street railway men have got to stand together more than ever before from the present outlook. Merged or unmerged, they have everything to gain by unity of action and cordial co-operation.

**NORTHERN OHIO INTERURBAN LINES**

The Columbus, Delaware & Marion Railway, recently placed in operation between Columbus and Delaware, forms the nucleus for an electric trunk system which will eventually connect Cleveland, Toledo and other Northern Ohio cities with the Buckeye State capital. The road is rapidly being extended northward from Delaware, and will be placed in operation to

there is little doubt that the cars of some of these roads will operate into Columbus over the Columbus, Delaware & Marion, and it is estimated that with these roads in operation the receipts from this traffic arrangement will be sufficient to pay all fixed charges on the line.

**ROUTE SELECTED**

The route traversed is the main north and south highway out of Columbus. From Columbus to Delaware the line parallels



TRESTLE AT SLATE HILL NEAR ENTRANCE TO GLENMARY PARK

Prospect within sixty days and to Marion before the close of the summer. Right of way has been secured for a branch to Richwood, which will be built this summer. Extensions north of Marion have been planned, but the exact terminal points have not been decided upon. It is certain, however, that con-

the Big Four and Pennsylvania on one side and the Hocking Valley on the other, the steam roads being from 1 mile to 2 miles on either side. So far as the suburban traffic is concerned the electric has considerable advantage over the steam roads, since it touches all the towns and hamlets on the old stage route, while the steam roads do not. Between Columbus and Delaware the pike is very thickly settled, the average population being about 2000 to the mile outside the incorporated country towns. North of Delaware is rich farming country with an average population of 800 to the mile outside the towns. The points touched and their population, and the distance from Columbus are shown in the accompanying table:



COMBINATION OF GAGES IN COLUMBUS

nection will be made which will afford through routes between Cleveland, Toledo and Columbus.

Aside from the business of its own line the road forms the natural entrance to Columbus for other roads now under construction or projected. At Delaware it will connect with two lines already under construction, while at Marion connection will be afforded with three lines for which all arrangements have been made. Under traffic arrangements already perfected

	Population	Distance From Columbus
Columbus ....	135,000	.. Miles
Clintonville ..	2,000	8 "
Worthington .	800	11 "
Stratford ....	250	23 "
Delaware ....	10,000	25 "
Radnor .....	300	33 "
Prospect .....	1,250	38 "
Richwood ...	1,400	46 "
Owens .....	250	43 "
Marion .....	17,500	47 "

168,750

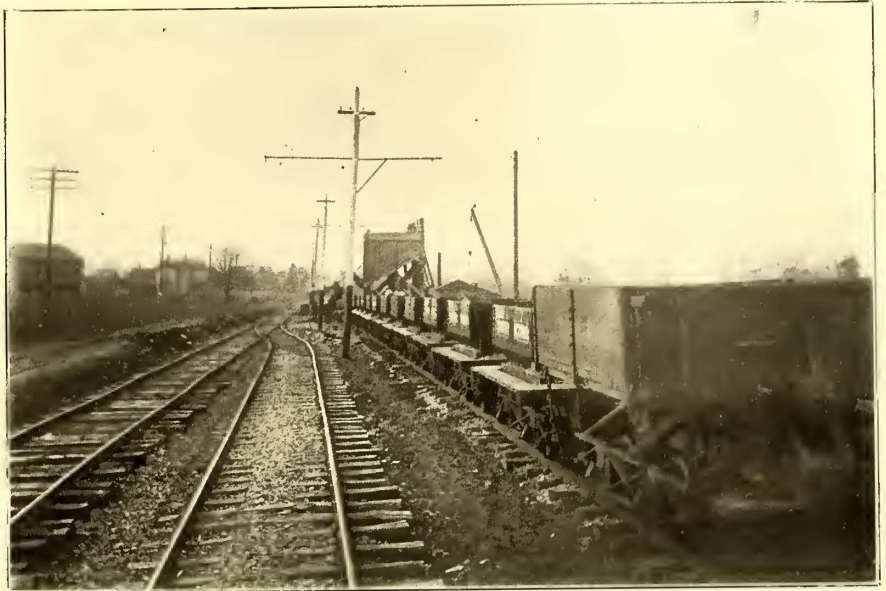
Clintonville is a beautiful suburban town inhabited largely by people who do business in the city. Worthington prides itself on having once been larger than Columbus. In the early 20's, when it was decided to move the State capital from Chillicothe to the central portion of the State, Worthington came within one vote of securing the prize. The town has hardly recovered from the disappointment of the failure, and has laid dormant ever since, until the improved transportation facilities

of recent years have put new life into the place. Delaware is the seat of a large college, which is attended by nearly 2000 pupils, and it is the capital of Delaware County. Marion is the capital of Marion County and is a live manufacturing town.

HISTORY OF THE SYSTEM

The Columbus, Delaware & Marion Railway is the outgrowth of a series of projects that have attempted to occupy the territory between Columbus and Delaware. The Columbus, Clintonville & Worthington Railway was built in 1893, and extended from North Columbus to Worthington. The following year A. Sullivan built a line from Worthington to Flint, but it was operated for a short time only as a horse car line. In 1901 James Holcomb and J. E. Lattimer, of Cleveland, purchased the Columbus, Clintonville & Worthington, and the Delaware City Railway, and proceeded to secure right of way for a connecting line, calling the company the Columbus, Delaware & Marion Railway. About the same time the Columbus, Delaware & Northern Traction Company was formed by John G. Webb, H. A. Fisher and others, who had been interested in building other lines out of Columbus. Both companies did considerable grading, and after a long series of legal disputes the Cleveland people finally sold out to Messrs. Webb and Fisher, who completed the road, retaining the name of the Cleveland company. Mr. Sullivan undertook to sell the Worthington-Flint line at the same time, but the franchise was of questionable value because of non-operation, besides being for a highway line, so the company declined to buy, but Mr. Sullivan had possession through Worthington, and

down Summit Street, the route directly down High Street being unavailable because of the broad gage (5 ft.) of the Columbus Railway Company. Later the Summit Street franchise was sold to the Central Market Street Railway Company, which was organized by allied interurban interests for the purpose of operating a standard gage city system. In approaching the



STONE CRUSHER AND BALLAST CARS

center of the city it was necessary to utilize Fourth Street, already occupied by the Columbus Railway Company, and this called for the laying of a third rail for the standard gage. The combination track, together with the combination-special work, are shown herewith. The combination track was formed by bolting two grooved rails together, the bolts passing through a cast steel plate, which is placed between the sides of the rails to make a solid joint.

All cars operate to the union interurban station located on Gay Street, near High Street, in the center of the city, which is equipped for both passengers and freight. Cars operate on hourly headway from Columbus to Delaware, and there is a local car operating on half-hourly headway between Columbus and Worthington, taking the place of the old Columbus, Clintonville & Worthington car.

At Delaware the company operates 7 miles of city system on fifteen-minute headway. This system comprises two city loops and three lines on main streets, connecting all the railway stations and affording excellent service for a town of this size.

The traffic arrangement in Columbus is a most desirable one. The city company gives only fifteen-minute headway, and the interurban cars are scheduled to arrive between the city cars, so there is no delay in enter-

ing the city. Cars do not stop for local passengers, and despite the fact that this route is considerably longer, the schedule to the center of the city is ten minutes faster than if the cars went directly down High Street, following the cars of the Columbus Railway Company. The traffic arrangement is on the Dayton plan, the city company taking one-half of the city fare for



STEEL BRIDGE AT STRATFORD

thus delayed construction work for a considerable time, until the Columbus, Delaware & Marion put several hundred men at work overnight and tore up the line, relaying with its own tracks and completing the work before morning.

TERMINAL FACILITIES

For entrance to Columbus the company secured a franchise

through passengers and all of the fares derived from local passengers. Each car is equipped with a Sterling-Meeker two-face register, and upon entering and leaving the city the conductor rings up the number of through passengers in the car. All through tickets read to or from the union passenger station. Passenger rates are considerably less than 2 cents per mile. In connection with other roads entering Columbus the company sells mileage books, good for the holder on any of the lines, at the rate of 1¼ cents per mile; \$6.25 for 500 miles and \$12.50 for 1000 miles. The steam roads operating between Columbus and Delaware have combined to fight the electric road for this business, and they are selling twenty-ride tickets at \$8, which meets the single-trip ticket of the electric road. These tickets



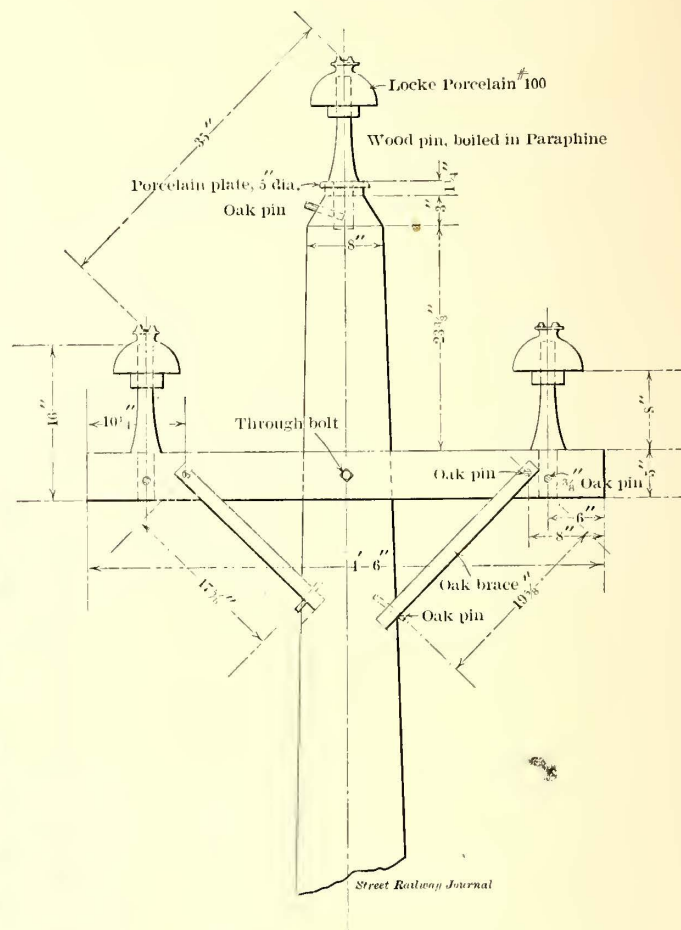
TYPICAL LINE SCENE

are interchangeable on any of the suburban trains of the three roads. The electric people claim that on account of the numerous advantages of their mileage books this action has not deprived them of the business of the commuters along the line. As soon as the track can be placed in suitable condition it is the intention to put on limited cars which will make the through run in one hour, about the same time made by the steam roads, with the added advantages of landing passengers in the business districts of both Delaware and Columbus.

ROADBED AND TRACK

Between North Columbus and Delaware the line parallels the highway except where it passes through villages, and then it takes the center of the street. Right of way is 20 ft. wide, and it is separated from the highway by a ditch and a fence. The inside line is also fenced. North of Delaware the right of way is from 50 ft. to 125 ft. wide across country, closely paralleling the Hocking Valley Railway. From Delaware to Prospect 13 miles is practically a tangent, and it has been selected by the General Electric Company as a place for making high speed tests. On the Columbus-Delaware section the maximum grade is 2 per cent except for one 3½ per cent grade, which is to be lowered. North of Delaware the grade limit is 1½ per cent. There are very few curves except in the cities, and none of them are over 4 degs., adapted for high speed. The company was unable to find gravel along its line, so it

purchased a stone quarry near Stratford and is ballasting the entire line with crushed stone. The crusher and construction cars are illustrated herewith. Track is of 70-lb. A. S. C. E. section in 30-ft. lengths. The company experimented with bonds on the Columbus-Delaware section, and used three types, namely, American Steel & Wire, Ohio Brass and Morris bonds. Rails are cross bonded every 1500 ft. with 0000 Ohio Brass bonds. Switches are 400 ft. long, with 79-ft. leads. No. 10 frogs are used, with high switch stands equipped with oil



DETAILS OF TRANSMISSION POLE

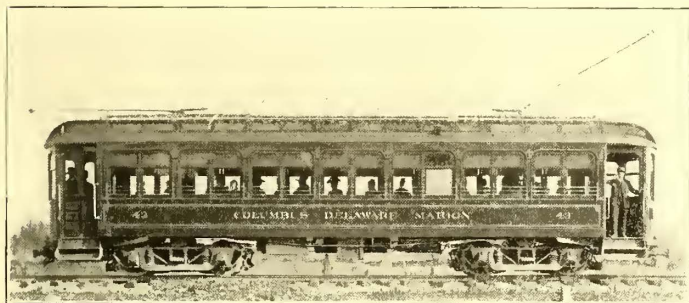
lamps and targets. At a number of dangerous road crossings the company has installed Parish gong signals. These start ringing when the car is within 1200 ft. of the crossing, and are operated by the trolley wheel tripping a switch attached to the trolley wire. There are few cuts or fills but there are several very good bridges, two of which, a double girder and a long trestle, are illustrated herewith. The trestle, which is 990 ft. long and 65 ft. high, is an unfortunate structure owing to the peculiar land formation of slate shale. The bank slides continually, and although the company has spent a large amount of money in driving piling and filling the bank it is impossible to keep the bridge in line. The trestle is well built, and of course perfectly safe, but the company has abandoned hope of keeping it in shape for high speed and will fill the entire ravine, requiring something like 300,000 ft. of dirt. Old settlers claim that the large tree to the left of the bridge shown in the cut has slid 50 ft. in as many years.

OVERHEAD

The pole line over the majority of the road is 35 ft. tall, spaced 100 ft. apart. The poles between North Columbus and Worthington are 40 ft. tall, with a 6-ft. cross arm near the top, carrying the lines of the Columbus Citizens' Telephone Company, under an arrangement which was inherited from the old Columbus, Clintonville & Worthington road. All poles are painted black to a height of 10 ft., with the balance white.

This feature, together with the white rock ballast, gives the line a very clean appearance.

Details of the overhead work and high-tension line as well as track are shown. Side arms are of 1½-in. pipe, 9 ft. long, guyed to the pole. Two 0000 grooved trolley wires are used. The west wire is continuous from one end of the road to the other without connecting with switch pans, all switches being on the east side of track. This leaves the line open for high-speed limited cars. The east line is continuous over the main track, but contains switch pans for sidings. Great care has been exercised in the construction of the high-tension lines, as 33,000 volts are used in transmission. Absolutely no iron is used at the top of the pole, except the through bolt which holds the cross arm. This cross arm is 4 ins. x 5 ins. and 4½ ft. long. Pins are 16 ins. long and No. 100 Loche porcelain insulators are used. Two of these are mounted on the ends of the cross arm, while the third is on the ridge pin, forming a 35-in. triangle. The top of the pole is cone shaped, and in this is bored a 2-in. hole 5½ ins. deep. The pin is driven into this and is secured by a ¾-in. round oak pin 5 ins. long. A 5-in. porcelain plate is placed around the base of the pin, and is provided with a raised groove, which prevents the dampness from getting into the top of the pole around the pin. Transmission wires are copper, No. 2 and No. 3, as required. Braces for the cross arms are oak, pinned with oak pins to cross arm



STANDARD CAR

and pole. Two Garton-Daniels lightning arresters are used to the mile.

#### POWER EQUIPMENT

The power equipment and methods of distribution are entirely on a temporary basis. In anticipation of extensions north of Marion it has been decided to erect the main generating station at that point, which will eventually be the center of the system. Plans for this station are being prepared and contracts will shortly be let. It has been settled that the original installation will comprise three 2000-kw steam turbines.

The present power station is located at Stratford at the falls in the Olentangy River. The company purchased the ruins of an ancient paper mill, and from the solid stone walls reconstructed the building into the present plant. The building faces the river and the old mill was formerly operated by a water-wheel in the race near the falls. The company is not at present operating the water power because of its varying efficiency. It is claimed, however, that in the wet season 500 hp can be derived, and an average efficiency the year round of 200 hp. The company owns the water right and proposes to utilize it later. The engine room of the building is 40 ft. x 80 ft., and the boiler room 46 ft. x 56 ft. A trestle has been erected at the side of the boiler room, and coal is dumped in bins below, having a capacity of twenty-five cars.

Three 250-hp Heine boilers are in use and two more are being installed. The boilers are hand fired, and they use Hocking Run of mine coal. Safety valves are set at 140 lbs. The present power equipment was intended for temporary service only, and includes several types of apparatus. There

is a McIntosh & Seymour twin tandem-compound four-cylinder engine, turning at 127 r. p. m., and belted to a four-pole General Electric railway generator of 400-kw capacity. On the other side of the room there is a Porter-Allen single cylinder engine, turning at 150 r. p. m., developing 500 hp normal, direct connected to a six-pole General Electric 400-kw machine. Then there is an Armington-Sims high-speed vertical engine turning at 260 r. p. m., and developing 250 hp, which is belted to a four-pole Westinghouse generator of 200 kw capacity. In the engine room there is also a Cochrane heater and Sorg purifier, rated at 1200 hp. In the basement below, and connected to the two large engines, is a 500-hp Dean condenser of the jet type. There are also two pumps, one operating the condensing system and the other the feed-water heater and purifier, and they are arranged to pump either way.

#### ELECTRICAL DISTRIBUTION

Of course the feeder system is at present on a temporary basis. The company is building sub-stations at Worthington, Stratford and Prospect, which eventually will be operated from the Marion power station through the 33,000-volt lines. Just now the entire line from Columbus to Delaware, including the



MOTORMAN'S CAB AND END CAR, SHOWING TURN-UP SIDE SEATS, LEAVING SPACE FOR BASKETS

Delaware city lines, is being operated by a single 500-hp unit. The sub-stations will be completed as soon as possible. The station at Stratford will be equipped with two 300-kw rotary converters, which will be run inverted and will furnish alternating current to the sub-stations at Worthington and Prospect, which in turn will feed their portions of the line each way, while the central section, including the Delaware city lines, will be fed directly from the power house. The high-tension line north runs entirely around Delaware.

Under the present arrangement there are three feeder panels on the switchboard. One panel feeds two 0000 trolley wires and one 0000 aluminum feeder south of Stratford; ultimately this will feed only half-way to Worthington, but at present it supplies clear to Columbus. The second panel feeds two 0000 trolley wires and one 0000 aluminum feeder from Stratford to the North Delaware line, including the city system. By means of pole switches in Delaware any line or any loop of the city lines can be cut out, should it be necessary at any time to turn the full pressure into the main line. The third feeder panel controls a No. 3 aluminum wire around Delaware, extending half-way to Prospect. Under the ultimate arrangement the Stratford water power will be utilized with a direct-connected generator to supply a battery of 264 cells to be installed in the present power house, and the present generating equipment will then be dismantled. The storage battery will feed in series

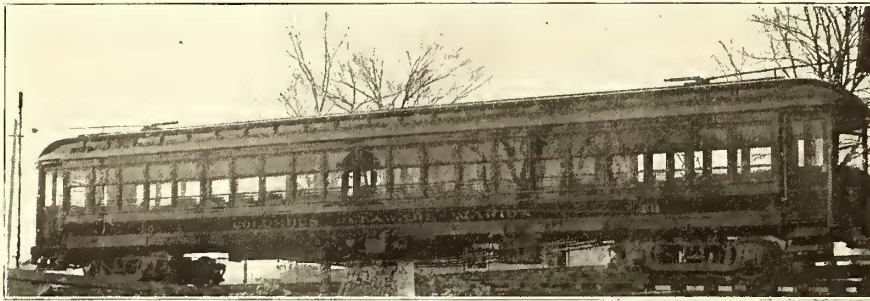
with the direct current side of the Stratford sub-station, and it will be of great advantage in handling heavy loads to and from Stratford Park or in event of heavy loads on the city lines.

#### CAR HOUSE AND REPAIR SHOPS

Adjoining the present power house the company is preparing to build a large car house and repair shop. The building will have stone walls with steel-trussed roof, and will be 127 ft. x 140 ft., with eight parallel tracks provided with pits and other necessary appliances. The company is now closing contracts for machine tools and other equipment necessary for handling all the repair work of the system.

#### ROLLING STOCK

At present the company has in regular operation six very



66-FT. EXCURSION CAR

fine passenger coaches; four were built by the G. C. Kuhlman Company, of Cleveland, and two by the Jewett Car Company at Newark. One of these Jewett cars was displayed at the Detroit convention last fall as the latest product of the Newark company's factory. The cars are of the same general pattern. They are 50 ft. over all, 38-ft. body, 8 ft. 6 ins. wide and 9 ft. high. They seat fifty-four passengers; sixteen in the smoking compartment. They have Hale & Kilburn walk-over seats finished in rattan in the smoker and plush in the passenger compartment; the Kuhlman's have green seats and the Jewett's blue plush. Toilet room and water cooler are located between the compartments. The cars are heated with Consolidated electric heaters. The interior finish is solid mahogany. Windows are the double Pullman type. They have Christensen air brakes equipped for multiple control. Mosher arc headlights,



INTERIOR EXCURSION CAR, SHOWING WIDE CROSS SEATS

Nichols-Intern air sanders, high speed Providence fenders, and are equipped with the General Electric type-M train control system. The "dead man's" handle is fitted with a special shroud, so that it is impossible to plug the switch. They are mounted on Peckham M. C. B. No. 32 truck, which has a 7-ft. wheel base. The Kuhlman's have four Westinghouse No. 76 motors and the Jewett's four General Electric No. 73.

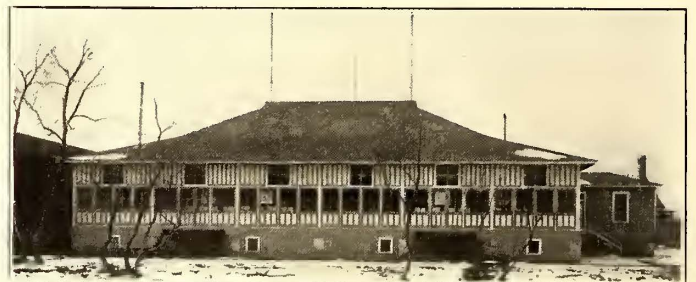
For the suburban service from Columbus to Worthington there are three 42-ft. Jewett cars with 32-ft. bodies. They have St. Louis M. C. B. trucks and are equipped with four 35-hp General Electric motors and K-12 controllers. For summer traffic and excursions they have just received from the Jewett shops two of the largest cars ever built for electric service. They seat eighty-four people, two in a seat. The end seats are placed lengthwise and can be raised when it is desired to carry picnic baskets. Interior finish is of oak and seats are all rattan. The windows drop level with the seats, making them practically summer cars. They are fitted with the same general equipment as the regular passenger cars. Interior and exterior views of these cars are presented herewith.

For freight service the company has provided two 55-ft. express cars, built by the Kuhlman Car Company. These cars are of unusual weight and are very strong. They have steel sides and are provided with two large doors on each side. The side sills are 8-in. channels running the whole length of the car. Bumpers are 3/4-in. x 12-in. steel plates. Cars have double floors and are open from end to end. They are to be heated with Smith hot-water heaters in order that they may handle perishable goods.

In its city service the company operates seven closed cars and six open cars. They are of the small single truck pattern, and have two Westinghouse 25-hp motors each.

#### FREIGHT AND EXPRESS

It is believed, and with good reason, that the package freight business will form a very heavy part of the gross receipts when the service is in full operation. There is a large amount of truck farming in the district between Delaware and Columbus, and the steam roads give very poor service. Deliveries are seldom made the same day, and in winter goods frequently freeze over night. This is the reason for the electric company heating its express cars. The company has a contract with the Delaware & Magnetic Springs Railway to run its freight car over to Magnetic Springs, where there is a famous spring of mineral water. Columbus is to be made the main distributing point for the water, and a carload per day is guaranteed the Columbus, Delaware & Marion. Freight is to be handled under the standard steam classification, but the rates are somewhat higher than ordinary steam freight. Milk is to be handled on a sliding scale as follows: One mile to 15 miles, 1.2 cents per



STRATFORD PARK PAVILION

gallon; 16 miles to 25 miles, 1.5 cents per gallon; 26 miles to 45 miles, 2.5 cents per gallon; 46 miles to 70 miles, 3 cents per gallon; cans returned free.

#### PARKS AND OTHER ATTRACTIONS

As a route for pleasure seekers the Columbus, Delaware & Marion will probably secure more of this class of business than any of the roads out of Columbus. Between Columbus and Delaware the line follows the Olentangy Valley, while between Prospect and Marion the road skirts the Scioto River, both affording much beautiful scenery. Aside from this the road is rich in pleasure resorts. At Olentangy Park, North Colum-



bus, a popular resort for Columbus people, the company has arranged to run a spur line into the grounds, and will force the Columbus Railway Company to divide the business to and from the resort.

At the north end of the Slate Hill trestle, which is illustrated herewith, the company has secured fifty-four acres, and is planning to make extensive improvements, with a view to making it a picnic ground for Columbus people. Shelter houses, platforms for games or dancing, swings, tables, benches, croquet grounds and other features will be installed. Not far from this park is a tract of 2000 acres which the government is seriously considering with a view to establishing a military post.

At Greenwood Lake, north of Delaware, the city line connects with Greenwood Park, a private enterprise. There are forty acres of wooded ground with shelter houses, stage, bowling alley and other attractions. This park is very popular with Delaware people.

Still another resort on this line is Gast Grove, near Prospect, which is a favorite camp meeting and picnic grounds for that section of the State. Heretofore the railroads have had heavy summer traffic to and from this point, but this spring the electric cars will run directly through the grounds.

The most popular resort on the road is Stratford Park, located near the power house, 3 miles south of Delaware. The company owns twenty-two acres on both sides of the river, and has erected the handsome pavilion herewith illustrated. It has a large dance floor, stage, dressing compartments, restaurant and other features. These are divided by glass partitions, and it may be closed and heated in winter. The pavilion is given free of charge, with heat and light, to parties guaranteeing a special car at \$35, or it is rented for \$10 an evening to Delaware parties who pay a 5-cent fare. The company has in-

stalled a number of steel boats, built by the Michigan Boat Company, and these are much in use. The picnic grove is located across the river, and this is reached by a ferryboat, which is operated by a cable and hand windless. A restaurant is conducted by a competent caterer, and arrangements may be made for anything from a simple luncheon to an elaborate dinner. If desired the company arranges to serve supper or refreshments on the car. The Olentangy River at this point is especially picturesque, and is rendered doubly interesting by the falls which are within a stone's throw of the pavilion, as will be seen in the accompanying illustration. The picnic



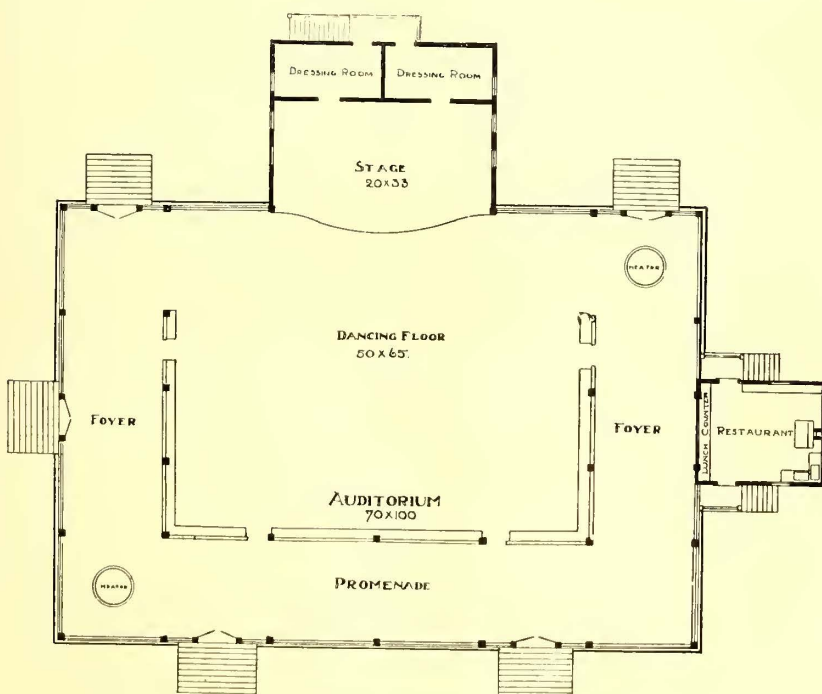
VIEW OF PAVILION AT OLENTANGY FALLS

grove is furnished with benches, tables, swings and other features which will add to the comfort of guests.

ORGANIZATION

The Columbus, Delaware & Marion Railway Company has a capital stock of \$1,500,000, of which \$500,000 is 6 per cent cumulative preferred and the balance common. There is an issue of \$1,000,000 5 per cent gold bonds covering the entire property.

The organization of the management has been completed in all departments. The officers are: John G. Webb, president; T. A. Simons, vice-president; J. M. Lorens, secretary; W. A. Black, treasurer; H. A. Fisher, general manager; Lee D. Fisher, chief engineer; G. G. Crane, master mechanic; E. W. Chandler, purchasing agent; A. L. Neereamer, general passenger and freight agent. Mr. Webb was one of the chief promoters of the Dayton, Springfield & Urbana Railway and of the Columbus, London & Springfield Railway. Mr. Fisher was also one of the chief promoters of the Columbus, London & Springfield Railway and the Central Market Street Railway, and for two years was general manager of the two lines mentioned. He sold out his interests in these roads to take up the Columbus, Delaware & Marion proposition. Lee D. Fisher was prominently identified with the building of all the lines mentioned here as well as the Columbus, Buckeye Lake & Newark road. He has entire charge of the engineering and construction work on the Columbus, Delaware & Marion. The writer is indebted to him for much of the information presented herewith.



PAVILION AT STRATFORD

**WESTINGHOUSE MOTORS FOR THE RAPID TRANSIT SUBWAY, NEW YORK**

As stated in the last issue the motor equipment contract for the cars of the Interborough Rapid Transit Company, more popularly known as the New York subway, was divided be-

The motors to be supplied by the Westinghouse Electric & Manufacturing Company were designed especially for this purpose, and were made to fit the particular conditions and requirements involved. One of these requirements, and perhaps the most difficult, was that of designing of a motor of large capacity to fit into a limited space. As a result the present motors are probably of smaller size for their output than any ever built heretofore.

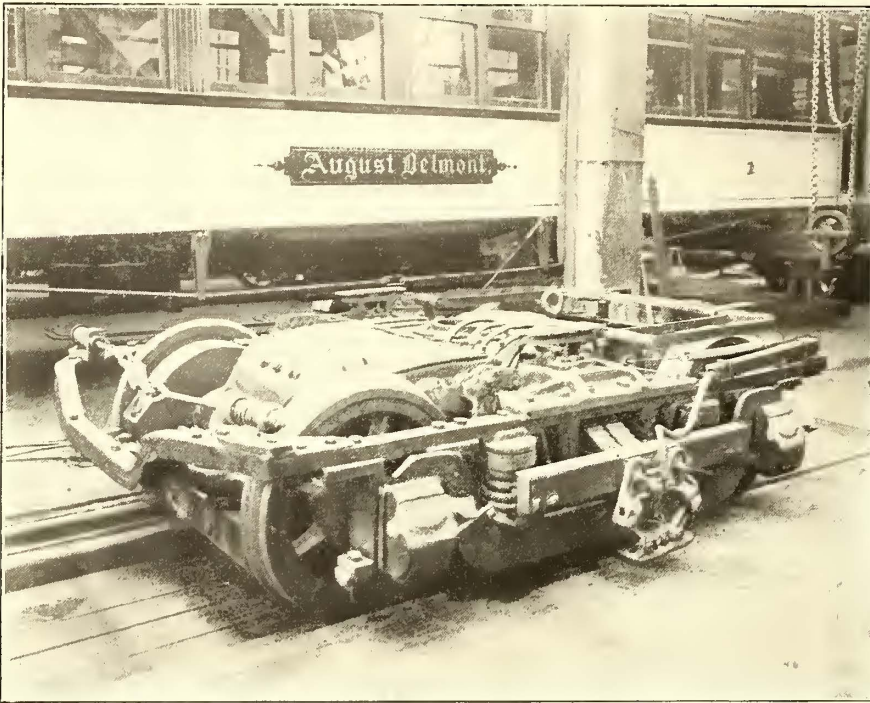
These motors, known as "No. 86," are of the heavy railway type, similar in general appearance to the well-known Westinghouse "50-C" motor. They will be supported on the truck by nose suspension. The normal capacity of the motor is 300 amps. at 570 volts, or 200 hp for one hour. With this current and voltage a tractive effort of 4150 lbs. is developed at the periphery of a 33-in. wheel, at a speed of 19 miles per hour. Although designed for an average voltage of 570, the motor will operate satisfactorily with voltages up to 625. It will carry loads up to 500 amps. without injurious sparking.

The motor has a field frame of cast-steel, divided into halves on the line of the centers of armature and axle, and completely surrounding the axle. There are thus no separate axle-bearing caps, and the number of pieces is consequently reduced to the least number possible for an easily accessible motor. The two halves of the field are held together by eight bolts, and by removing these the top half of the field can be readily lifted off

and access gained to the interior for inspection, repairs or the removal of the armature or field coils. When the top field is removed the lower half remains suspended from the axle by stirrups, which are permanently attached to the axle bearings.

The four-pole pieces are made of laminated steel punchings, held between heavy end plates and secured by rivets. Each pole piece is bolted to the field frame by three bolts. These bolts do not pass through the pole pieces but terminate in a long nut inside, thus affording a smooth unbroken surface and absolutely rigid poles.

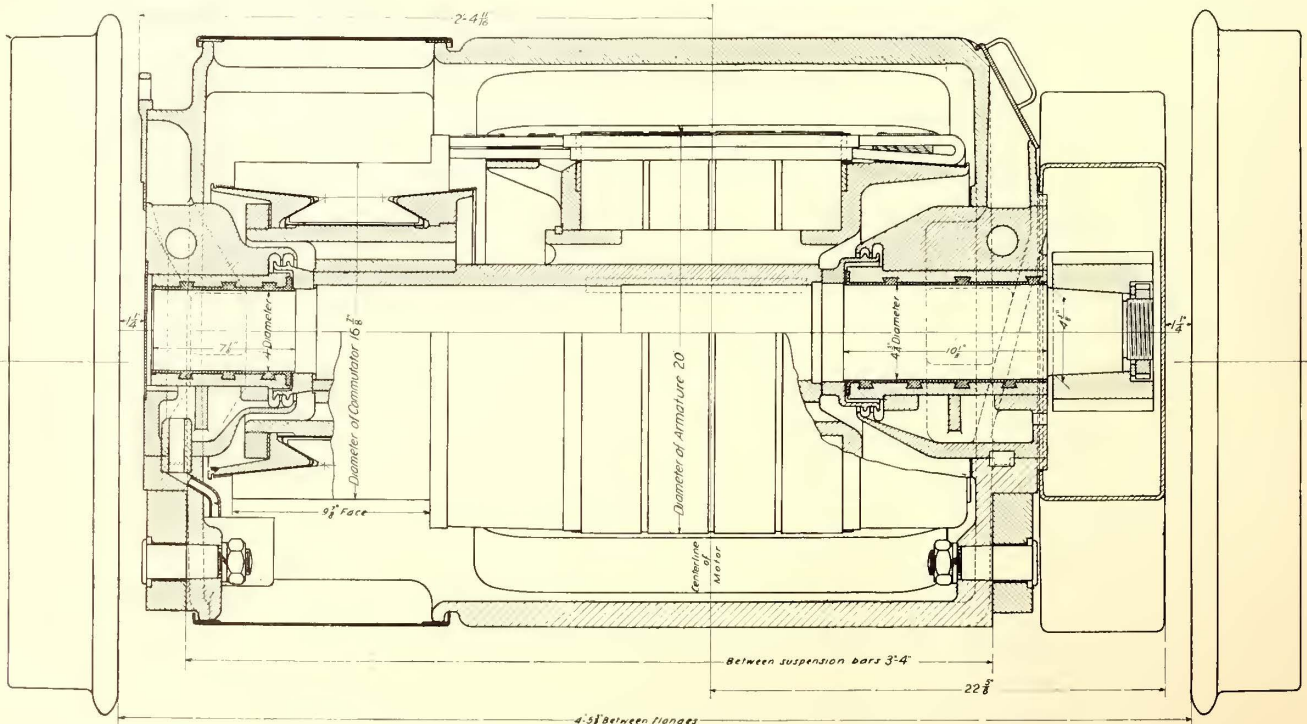
The field coils are made of copper strap wound on edge. All



WESTINGHOUSE NO. 86 MOTOR MOUNTED ON TRUCK FOR SUBWAY TESTS

tween the Westinghouse Electric & Manufacturing Company and the General Electric Company:

The subway company will operate two classes of train service. The first will consist of five-car local trains, composed of three motor cars and two trailers, making an average speed of approximately 16 miles per hour. The second will be eight-car express trains, comprising five motor cars and three trailers, and the requirements of the franchise include the maintenance of an average speed of 30 miles per hour. The same motors and gearing will be used for both classes of service. Each motor car will be equipped with two motors.



VERTICAL SECTION OF WESTINGHOUSE NO. 86 RAILWAY MOTOR

four coils are exactly alike in form and in number of turns. The insulation between turns consists of asbestos and mica, held in place by shellac and baked at a high temperature under heavy pressure, so that the coil and insulation make a solid mass. The completed coil is sealed in a curved metal case, from which it is insulated by molded mica made like the V-rings of a commutator. This construction gives a coil which is absolutely fireproof, moisture proof and practically indestructible. Each coil is held in place by the metal case or shell, which is securely bolted to the frame.

The armature is 20 ins. in diameter and weighs 1930 lbs. It is of the slotted-drum type, and is composed of sheet steel punchings assembled on a cast-iron spider. The commutator is also carried on the same spider, and shaft may thus be removed and replaced, should this ever become necessary, without disturbing the armature winding or its connection to the commutator. The winding is of the two-circuit type, and is of ventilated construction. There are fifty-three slots and 159 coils, i. e., three coils per slot. Each coil consists of a single turn of copper strap. The three coils which rest in each armature slot are formed and insulated before being put in place. They are placed in the slots without bending or hammering, and are carefully insulated from each other and from the core. Each conductor is continuous between commutator bars, thus giving minimum resistance and allowing the most effective insulation on all parts of the conductor.

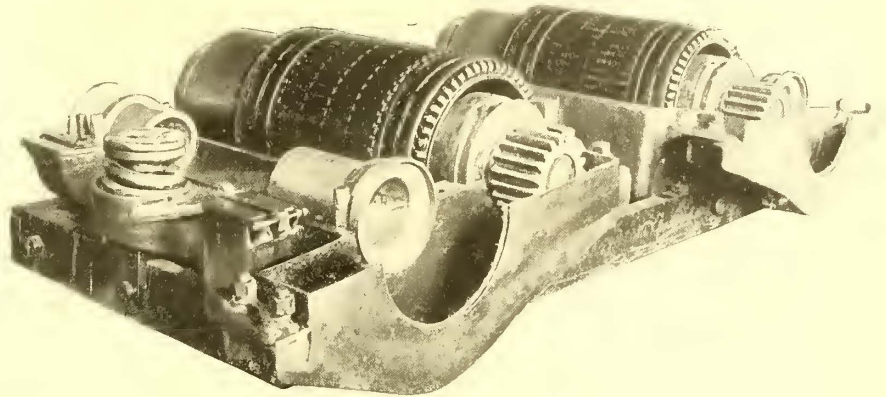
The coils are held in the slots by wedges of special unshrinkable material, which will withstand a high degree of heat without injury. This greatly facilitates the removal and replacing of the armature coils.

The armature insulation consists essentially of mica, which extends between turns at all points. The mica is protected by a sufficient amount of fibrous material to insure against deterioration, due to mechanical vibration. This fibrous material is treated with a moisture and oil-proof compound. An insulation is thus formed which has fireproof material between turns and between copper and iron at all points, and is, therefore, capable of withstanding very high temperature without injury.

The commutator is composed of 159 rolled and hard-drawn copper bars. These bars have solid necks raised above the sur-

mica of a hardness that insures its wearing at the same rate as copper. The mica separating the bars from the rings is 1-16 in. thick, and the mica ring also separates the bars from the commutator spider. The wearing surface of the commutator is 16 $\frac{7}{8}$  ins. in diameter and 9 $\frac{7}{8}$  ins. long. The bars are of a depth which allows a reduction in diameter of 2 ins.

The brush holders consist of two cast-brass arms, each secured independently to the commutator end of the upper



NO. 86 MOTORS WITH BALDWIN-WESTINGHOUSE SUSPENSION-UPPER FIELDS REMOVED

frame casting by a special vulcabeston-headed bolt. The arms and bolts are insulated from the frame by fuller-board and mica bushings.

Each arm carries three carbon brushes, 5/8-in. x 3-in. in sections. The brushes slide over finished surfaces and each is pressed on the commutator by a spring finger. The tension of these fingers is readily adjustable and the brush-holder arm is arranged for radial adjustment to allow for wear of the commutator. Copper clips are bolted to the carbon, and these clips are connected by flexible shunts, of ample capacity, to the body of the brush holder, thus relieving the springs from carrying the current. By this arrangement each brush holder can be easily removed through the opening above the commutator by loosening a single bolt.

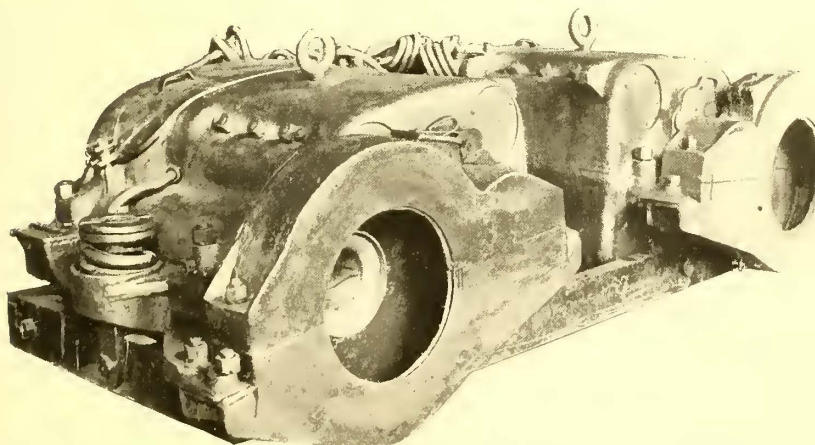
Field and armature leads extend 5 ft. outside the motors, and are furnished with detachable connectors. The bottom field lead is brought out to the end of the lower field frame and carried up through a leader on the end of the upper field frame, avoiding necessity of disconnecting it when opening the motor.

The completed motor will stand an insulation test between winding and motor frame of 4500 volts, alternating momentarily, or a test of 3000 volts for one minute.

The armature bearings are contained in housings, which are securely held between the halves of the field frame, being tongued and grooved to the frame and accurately boweled. At the pinion end the bearing is 4 $\frac{1}{4}$  ins. x 10 ins., and at the commutator end 4 ins. x 7 ins. These bearings are provided with drip grooves, into which oil is thrown by wiper rings on the shaft. The bearing boxes are of phosphor bronze, lined with babbitt metal well grooved for oil. The axle boxes are made to suit a 6 $\frac{1}{2}$ -in. axle and are 12 ins. long.

Armature and axle bearings are lubricated by oil fed to the journals by waste, in accordance with standard railway practice. The oil boxes are formed so that the waste will pack itself against the journals. The oil box covers are lipped and hinged, and fitted with springs that keep the lids tightly closed or hold them open as desired. Drip boxes are provided to catch all waste oil so that no oil can get into the motor.

The gears are solid, of cast-steel, with cut teeth. The



NO. 86 MOTORS COMPLETE, WITH BALDWIN-WESTINGHOUSE SUSPENSION

face of the commutator with milled slots, into which the armature bars are tightly soldered. The bars are mounted on a cast-iron spider and held in place by two steel V-shape rings, one of which serves as an oil guard thoroughly to protect the mica from oil or grease. A low voltage between the commutator bars is secured, decreasing the liability of flashing from any cause. The bars are insulated from each other by sheets of

diametrical pitch is  $2\frac{1}{2}$  per inch, and the face is 5 ins. The pinions are forged steel with cut teeth. They are taper bored to fit the shaft and are held in place by a nut and lock washer. The diameter of the shaft at the large end of the taper is  $4\frac{3}{8}$  ins.

The gear case is made of malleable iron planed to a tight joint, with a suitable opening at top, having a hinged cover. It is supported at the ends by horns cast on the motor frame, and so shaped that they support the gear case without side strain, the weight being carried on its own plane. The whole motor can be dismantled with great ease and despatch without the use of any special tools. The total weight of motor, gear, gear case, etc., is about 6600 lbs.

It is safe to say that the performance of this motor in every particular will uphold and add to the world-wide and deserved reputation of Westinghouse motors for efficiency, durability and low cost of maintenance.

### IMPROVEMENTS AT ST. JOHN, N. B.

The St. John Railway Company, which controls the street railway, gas and electric lighting business in the city of St. John, N. B., is planning extensive improvements in its present power station, and is figuring on building about 6 miles of new track. Contracts have been let to the Canadian General Electric Company for a new 650-kw direct-current railway generator, and for a 600-kw and a 300-kw alternator. The present railway equipment will be retained as reserve capacity.

The present system in St. John consists of about 12 miles of track, 74-lb. T-rail being used, except on curves. The company owns 22 cars and will purchase more. The winter schedule now requires thirteen cars, two of which are operated in shuttle service on the present single-track line on Douglas Avenue, and the remaining ten in the city proper.

Cars in St. John run on the left-hand track, and the conductors collect fares with a portable fare box. The equipments are all two-motor Westinghouse 12-A's, the motors being rated at 30 hp, with the exception of one equipment, which is composed of two 50-hp Walker motors. The winter cars are all vestibuled and are heated by stoves. The fenders are of simple construction, arranged to fold up vertically against the dasher when not in use, and were made specially for the company's service.

The topography of St. John, which is a city of some 44,000 people, is quite hilly, the grade on the King Street line, opposite the Royal Hotel, being about 8.5 per cent.

The company sells six tickets for 25 cents, and liberal transfer privileges are granted. The time limit on the transfers are punched out of a dial printed upon the ticket in two circles, one indicating the hour and the other the nearest five minutes.

The company's power station is located on Union Street, and the electric railway apparatus is composed at present of one 200-kw, 4-pole, 425 r. p. m., and one 225-kw, 6-pole, 425 r. p. m. 550-600-volt Canadian General Electric generator, and two 500-550-volt 200-kw Westinghouse railway units. A McIntosh & Seymour horizontal tandem compound engine drives each pair of generators by belts. Each generator has its separate switches and ammeter at the switchboard, and the system is electrically fed in two parts, about ten cars being on one section and three on the other. On the main line a five-minute service is maintained. About fifteen minutes are required to go from the center of the city to the bridges across the St. John. No advertising is displayed in the cars.

Taken as a whole, the street railway situation in St. John suggests immediate expansion and improvements, and as the city itself is an important railroad terminus, with the excellent harbor facilities and enjoying an important commercial position. The officers of the St. John Railway Company are: James

Ross, of Montreal, president; J. M. Robinson, of St. John, vice-president, and M. Neilson, secretary and treasurer. The active management is carried on by Mr. Neilson, to whose courtesy this paper is indebted for most of the above information.

### TROLLEY TRIPS FOR WHIST PARTY

The interurban lines established by electric railway companies in many parts of the country have done much to promote good fellowship between residents of nearby towns along these routes, and they have been utilized for theater parties,



WHIST PARTY ON AN INTERURBAN CAR

excursions and other pleasure trips. One form of recreation that promises to grow popular in the West is a trip on a parlor car into the country by whist clubs. The accompanying cut illustrates an expedition of this kind, showing a whist party given on one of the handsome interurban cars running between Oshkosh and Neenah, Wis., over the line operated by the Winnebago Traction Company. The car was tastefully decorated with flags and bunting, the floor between the seats and in the aisle was covered with rugs, and a profusion of sofa cushions gave the car a very cozy appearance.

The party consisted of twenty-four ladies, who engaged in a delightful game of whist. The time consumed in making the trip and side tracking, where refreshments were served, was about four hours. Buffet lunch was served from the express compartment of the car. Hot coffee was served from the rear vestibule, where waiters in white were in attendance. Card tables were provided for by using heavy cardboard cut large enough for the purpose, and being supported in the laps of the players.

The whole arrangement was very attractive in effect, and the party was pronounced most novel and entertaining.

The Chicago General Railway began selling six tickets for 25 cents March 15. It also announced that it would issue and receive transfers to and from intersecting lines of other companies; but evidently no traffic agreement has been made, as transfers to the Chicago General cars were not issued by other companies, nor were Chicago General transfers accepted on the foreign lines. A similar move was made by this company several years ago with similar results.

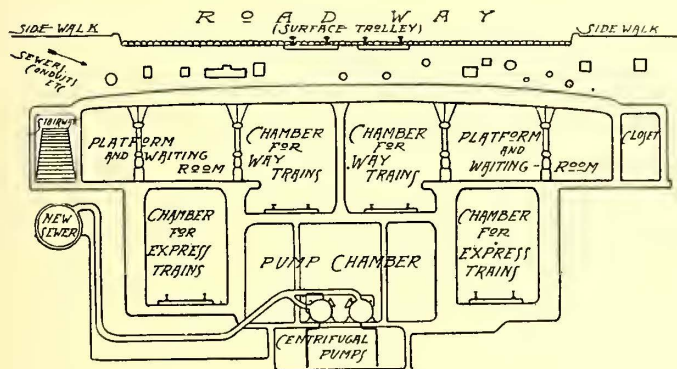
**NEW SUBWAY IN PHILADELPHIA**

Bids for the construction of the first section of its new subway on Market Street were received by the Philadelphia Rapid Transit Company on March 16. The bids are now being considered by the executive committee of the company, consisting of President John B. Parsons, George D. Widener, William H. Shelmerdine, John M. Mack and Michael Murphy. It is thought that the contract will be awarded within a few days, to allow the contractor to commence construction before April 9, the time limit fixed by the franchise ordinance.

The first section to be built is that from Fifteenth Street to Twenty-Second Street, in which there will be four tracks, besides a central drainage chamber. A section of the construction proposed is presented herewith, but detailed drawings will be published later. The point at which the section shown on this page is taken is at the corner of Nineteenth Street, at which there is a way station and where the subway is 74 ft. 4 ins. wide between walls. Special attention is given to both ventilation and drainage; four exhaust fans will be located at this station, while two pumps will discharge the drainage water from a pump well to the Market Street sewer.

It is the intention of the company when the entire system is in operation to run both express and accommodation cars on separate tracks. The last express stops going west will be at Fifteenth Street, and after the cars leave that station no stop will be made until Thirty-Second Street is reached. The Schuylkill River will be crossed by means of a new bridge.

In width and depth the western section of the subway will be very large. From the top of the street grade to the bottom of the drainage well the distance will be about 48 ft. The distance



SECTION OF SUBWAY AT NINETEENTH STREET, PHILADELPHIA

between the subway roof, which will be built of steel and lined with concrete, and the street grade will vary from 3 ft. to 6 ft. The chambers for the express trains, which like the rest of the subway will be lined with concrete, will be 15½ ft. high and 11½ ft. wide. The two chambers for the way trains will occupy 26 ft. of space in width and be about 14½ ft. high. The platform and waiting station will be commodious, occupying in width about 20 ft.

**LAYING TRACK IN THE NEW YORK SUBWAY**

On the afternoon of March 14 Mayor Low, of New York, drove the first spike in the track laid in the New York subway. The event was made the occasion of quite a large gathering at the Sixtieth Street or Columbus Avenue Circle station of the subway, which has recently been completed.

Among those present were all the Rapid Transit Commissioners, including President A. E. Orr, John H. Starin, Wood-



MAYOR LOW DRIVING FIRST SPIKE IN SUBWAY TRACK, MARCH 14

bury Langdon, also Contractor John B. McDonald, Secretary Evans, President of the Borough Jacob A. Cantor, Corporation Counsel George L. Rives, President of the Board of Aldermen Fomes, John Whalen, William Barclay Parsons, R. A. C. Smith and many others.

Contractor McDonald led the official party to the spot selected for the first spike to be driven. A handsome hammer, gilded with silver and decorated with the national colors, was ready, and was handed to the Mayor. Contractor McDonald then took a silver spike from his pocket, saying:

"Mr. Mayor, this is the first spike to be driven for the tracks of this railroad."

The spike was then inserted by Superintendent C. W. Wilson, of Naughton & Company, contractors for that section of the tunnel, in the hole drilled in the tie to receive it. The Mayor then grasped the hammer and sent the spike home. The spike was then wrenched out and the ceremony was over. Mr. McDonald is to present the spike to the Mayor after it has been suitably inscribed.

**THE DETROIT UNITED RAILWAY TRADE MARK**

The Detroit United Railway Company recently conducted a prize competition for the best design for a company trade mark to be used on all the company's stationery and cars. A prize of \$25 was offered for the accepted design. There were 500 designs submitted. The one finally chosen was suggested by W. J. Ryan, of Detroit, and will be reproduced in an early issue of this paper.

## TEST OF SUBWAY MOTORS

Before selecting the car equipment for the subway the Interborough Rapid Transit Company, of New York, conducted an investigation into the merits of the apparatus submitted by the General Electric and Westinghouse Companies, based upon the requirements of the service in which they were to be employed. As has already been announced the contract for motor equipments was divided between the companies named, the Westinghouse No. 86, which is described elsewhere in this issue, and the General Electric 69, which was described last week, being selected. Both motors were especially designed to meet the requirements of the subway specifications.

The tests were the most extensive and exacting that have ever been made in electric railway practice, and comprise a most complete scientific investigation of the performance of this class of apparatus. The care exercised by the Interborough Company, through its engineering department, in the selection of apparatus, as exemplified in this investigation, shows an appreciation on the part of the management of the difficulties which will be met in the service proposed, and the necessity for adopting a high standard for the equipment of the line.

The specifications for the motor equipments, as well as other electrical features of the installation, were prepared by L. B. Stillwell, the electrical director of the company, and the tests were conducted under his supervision and in accordance with plans prepared by him.

The tests may be divided for the purposes of classification under two general headings, namely, shop tests and actual running tests under ordinary conditions of operation. The first were made in the factories of the General Electric and Westinghouse Companies, at Schenectady and Pittsburg, and the latter on a half-mile course of the Manhattan Elevated system, and also a few tests on the experimental track of the General Electric Company at Schenectady. The cars used were similar in design, construction and weight to those which will be operated in the subway.

This investigation has extended over several months, including the preliminary shop tests, and have been watched with keen interest not only by the subway officials and the engineers of the manufacturing companies interested, but by all who are engaged in heavy electric railroading or are giving the subject careful study. Mr. Stillwell's preliminary report shows that shop tests were made under forty-three separate headings, some of them requiring an elaborate series of operations extending over considerable periods. An idea of the comprehensive nature of these investigations and the methods employed in making the tests may be gained from the following summary of the work performed:

### SPEED CURVES

Speed curves were taken at 570 volts and 285 volts, in both directions of rotation.

### SEPARATE LOSSES

Under this heading records were made of resistance of armature, of field and of separate field coils; also of brushes at different commutator speeds and currents, and with 2-lb., 4-lb. and 6-lb. pressure per brush.

Core loss was determined when the motor was driving itself with the armature shunted or with separately excited fields, and also by driving with a separate motor.

Iron loss of armature without windings was determined by driving with separate motor.

Friction without gears was determined with the motor driving itself, and also by driving with a separate motor.

Brush friction was separated from other frictions, and gear friction was calculated from brake tests, while load losses were determined from input-output tests.

### EFFICIENCY

In these tests calculations were made first from losses.

Efficiency without gears was determined by measuring the input and output of two motors coupled together, one being driven as a generator; and also by running two motors in series coupled together and supplying the losses. Efficiency with gears was determined with prony brake. In all cases current was furnished at 570 volts and 285 volts.

### COMMUTATION

Potential curves were made across the commutator, with loads of 100 amps. and 300 amps.; also with fields separately excited and only enough armature current to drive the motor.

The commutation was tested up to 600 amps. and 570 volts, and 450 amps. and 625 volts in both directions; likewise up to 600 amps. and 570 volts with  $\frac{5}{8}$ -in. brushes.

### INSULATION

An insulation test with 4500 volts alternating-current was applied to the connected and disconnected parts of the motor for five seconds, and the leakage was determined by voltmeter readings.

### RADIUS OF GYRATION

Experimental determination of the radius of gyration of armature from friction curve was made.

### CENTRIFUGAL TEST

Rotation of the armature at a speed 50 per cent greater than acquired in service was required.

### TEMPERATURE TESTS

The rating of these motors was 200 hp, and current of 295 amps. at 570 volts was passed through them for one hour with all covers off. Temperatures were taken by thermometer and resistance, the thermometers being heated to 60 degs. C. before being applied. Additional temperature runs were made as follows:

At 100 amps. and 350 volts, all covers off, 12 hours.

At 136 amps. and 270 volts, with  $\frac{3}{8}$ -in. mesh screens on top, open at bottom and ends, 12 hours.

At 157 amps. and 300 volts, with  $\frac{3}{8}$ -in. mesh screen on top, open at bottom and ends, 12 hours.

At 162 amps. and 360 volts, all covers off, 12 hours.

At 162 amps. and 360 volts, all screen covers on,  $\frac{3}{8}$ -in. mesh, 12 hours.

At 162 amps. and 360 volts, all solid covers on, baffle plates out, asbestos lining under the commutator cover, 12 hours.

At 176 amps. and 350 volts, all covers off, 12 hours.

At 176 amps. and 350 volts, all screen covers on,  $\frac{3}{8}$ -in. mesh, 12 hours.

At 176 amps. and 350 volts, all solid covers on, asbestos lining under commutator cover, baffle plates out.

At 250 amps. and 350 volts, all covers off.

At 450 amps. and 350 volts, all covers off.

### COOLING CURVES

A cooling test was made with motor standing and all covers off, and also with motor being driven at 480 r. p. m., all covers off, brushes on and no current in motor.

### FLASHING OVER TESTS

Flashing over tests were made of both motors with ampere loads and armature speeds corresponding to the local, express and compromise gear ratios at 570 volts and by steps up to 700 volts, with circuit interruptions of 1, 3 and 5 seconds. The speeds were allowed to increase as the voltage increased, the amperes being kept constant.

### ROAD TESTS—POWER CONSUMPTION

Tests were made of the power consumption in a train with one-third of the motor equipment of a full local service train, that is two motors, and one-third of the weight. The typical local service run was made over 2030 ft. in 70.5 seconds, 1.5 miles per hour per second acceleration, full multiple reached in 11.4 seconds. The average of eight runs was taken. The same automatic recording instruments for voltage, current, distance, speed, acceleration and braking were used on both motor cars.

## ROAD TESTS—HEATING

Heat runs were made on both motor trains with one-third the motor equipment and one-third the weight of the local service trains.

The conditions under which this test was made were as follows: Distance, 2030 ft.; schedule, 85.5 seconds, with 1.5 miles per hour per second acceleration; control, full multiple in 11.4 seconds; braking not exceeding a maximum of 2 miles per hour per second, and a 15-second stop at stations. The runs were continued until the temperature measured by resistance became constant.

## CONTROLLER TESTS

Controllers were tested under overload conditions for durability, reliability, reversing and smoothness of acceleration as well as the serviceability of their automatic features.

## MECHANICAL FEATURES

Both motors were examined as to their mechanical details and durability and their factors of safety calculated.

## METHODS EMPLOYED IN MAKING TESTS

## RESISTANCE

**Armature**—The resistance of the Westinghouse No. 86 armature was obtained by substituting a single beveled copper brush for the carbon brushes in each holder, the edge of the copper brush making contact with the first and forty-first commutator bars. A current of 40 amps., 50 amps. and 60 amps. was then sent through the armature, and the drop measured with a voltmeter on the ears of the same commutator bars.

The resistance of the General Electric No. 69 armature was measured by screwing a plug into the first and fortieth commutator bars, taking out the carbon brushes and sending a current of 60 amps., 80 amps. and 90 amps. through the armature, and measuring the drop with a voltmeter on the ears of the same commutator bars.

In both cases thermometers were placed on both the iron and the coils of the armature to obtain their temperatures. In neither the Westinghouse nor the General Electric motor was allowance made for the difference between the resistance as obtained across forty bars of the commutator in the Westinghouse, and thirty-nine in the General Electric motor and the exact electrical center of the armature.

**Field**—The resistance of the fields was measured in the same general manner. With the Westinghouse motor currents of 40 amps., 50 amps. and 60 amps. were used, and 60 amps., 80 amps. and 90 amps. with the General Electric motor. There was no special reason for using different currents in the two cases, the scales of the instruments used governing the selection of those employed.

In both cases the potential drop was measured by a voltmeter with contacts inserted into the cable at its exit from the motor, thus cutting out all outside cable, but including all internal cables in the resistance of the field.

**Field Temperature**—In obtaining the field temperature while running the same contact points as mentioned were used, the current being held steady for the potential drop reading.

**Brush Resistance**—The brush drop, including the brush holders and armature cables, was measured by heavily short-circuiting the commutator at its ears and measuring the potential drop with different currents up to the capacity of the motor, and at all commutator speeds within the range of its operation. The results, while variable, were satisfactory and check.

## CORE LOSS

The core losses of both motors were measured by driving them as motors with separately excited fields or with shunted armatures and also by driving them with a separate motor. The results agree very closely. The results were plotted in terms of the voltage impressed on the motor, allowance being made for C<sup>2</sup>R drop in armature, field and brushes.

## FRICTION

The friction losses of both motors were obtained by measur-

ing these losses with the motors driving themselves and also when driven by a separate motor.

## LOAD LOSSES

The load losses without gears were obtained in both motors by the input-output method, the two motors being coupled together with one motor driving the other as a generator. The difference between the input to the motor, after deducting the known C<sup>2</sup>R losses of the armature, field and brushes and the core loss and friction, and the output of the generator, after adding to the measured output the known C<sup>2</sup>R losses of the armature, field and brushes and its known core and friction losses, being the stray or load losses of the two motors combined. It has been assumed that this difference belongs pro rata to each motor. Any difference that existed between the friction of the combination and that of the sum of the friction of each motor, as determined separately, was added to or subtracted from the output as the case might require. The resistance, core, brush and friction losses of the second motor were determined before the test.

## SPEED CURVES

The speed of the motors was determined in different directions and corrected to a temperature of 75 degs. C. The speed curve used in working up results was taken counter clockwise, this direction of rotation being observed in all the schedule tests of both motors.

## BRAKE TEST WITH GEARS

Brake tests with gears were made on both motors, the speeds being taken from the speed curve at 75 degs. C., as being more accurate than any possible determination during the test.

## GEAR FRICTION

The difference between the efficiency as determined by the input-output method and that determined by the brake test, was assumed as representing the gear friction. In making all brake tests the gears were allowed to run for from twelve hours to fifteen hours before making the test.

## COMMUTATION—POTENTIAL CURVES

To assist in the determination of the commutation merits of the two motors potential curves were made by the step by step process across from one brush holder to the other. These measurements were made at 230 volts approximately, and from these results were calculated for 570 volts. Tests were made with 100 amps. and 300 amps. in the field, and only enough current in the armature to drive it, and also with the motor operating as a full series motor with 100 amps. and 300 amps.

The motors were further tested for commutation up to 600 amps. and 570 volts in both directions of rotation, and up to 450 amps. and 625 volts in both directions.

## EFFICIENCY

The efficiency of the motors without gears was determined from the input-output tests, as checked up by the separate armature and field C<sup>2</sup>R losses and the brush, core, friction and load losses.

The efficiency of the motors with gears was determined from the brake tests.

## TEMPERATURE

The temperature runs serve to compare directly the Westinghouse and General Electric motors at those points selected by them respectively, as representing the equivalent heating effects of the express and local schedules as outlined in the specifications. Each motor was tested not only on its own equivalent but also on that of its competitor.

In these tests the temperatures at the start and also at the end were determined by both thermometer and resistance. The curve of the rise in temperature was determined by measuring the field drop at half-hourly intervals. Thermometer readings were also taken of the frame and room temperature during the progress of each test. In all cases care was taken to prevent unusual draughts from striking the motors. In arriving at the final temperatures allowance was made for the time elapsing

between the end of the run and the determination of the temperatures of the armature and field by resistance and by thermometer. Cooling curves were prepared to ascertain the amount of difference caused by this interval of time. The temperatures, as indicated by the field resistance during the run, have in all cases been given predominating value.

#### CALIBRATIONS

A carefully calibrated voltmeter and ammeter were carried from the Weston Instrument Company's factory to both the Westinghouse Company and to the General Electric, and compared with their working standards. After the tests were made the instruments were again calibrated by the Weston Instrument Company and found practically the same as when first issued. These instruments were not used in making any tests.

## ENGINEERING PRELIMINARIES FOR AN INTERURBAN ELECTRIC RAILWAY—III.

BY ERNEST GONZENBACH

### ELECTRICAL CAR EQUIPMENT

In order to determine the details of car equipments it is necessary to again refer to the run sheet, Fig. 2, in the first chapter (STREET RAILWAY JOURNAL, March 7, 1903). There are two conditions which must be met by one type of cars and the cars must be used interchangeably. The local cars call for a schedule speed of 21 miles per hour, and the fast or "limited" cars for a schedule speed of 34 miles per hour. The only accurate method of determining the size and nature of the proposed equipment is by a system of "speed-time curves," and from these curves obtain the square root of mean square current per motor and the maximum current. While such a set of curves may be scoffed at as "theoretical" by some "practical" railway men, it may be remarked that a little of this theory applied in the right place might have prevented the investment of thousand of unnecessary dollars in many cases, and in others might point to profitable investments of larger sums in motors.

The status of the D, E & F Railway, however, being as yet somewhat preliminary, a more rough and ready method had to be used to arrive at a preliminary estimate of the equipments to be installed. The route was divided into sections of varying length, and the stops to be made by the limited cars were noted and marked. All points requiring a slowing down of speed were carefully noted, and the result tabulated as follows:

Average speed m. p. h.	Total distance miles	Time required minutes
10	3.6	21.5
13	1.8	8.3
18	2.5	7.0
25	1.9	5.3

As there is a street mileage of but 5.4 miles the schedule is not seriously interfered with. The allowance of 3.6 miles at 10 miles per hour is exceedingly liberal, and in actual service should be bettered. Deducting the mileage and time noted from the totals we have 52.7 miles which must be covered in 67.9 minutes to make the schedule proposed. This gives an average maximum speed of 46.5 miles per hour, which is rather low in the light of recent installations.

As a check on these figures we may deduct the strictly street operation of the cars at 10 miles and 13 miles per hour, and we have a balance of 57.1 miles to be made in 80.2 minutes with six stops, or a schedule speed of 42.5 miles per hour with stops 9.5 miles apart. It should also be remembered that there is a ten-minute lay over provided so that cars may make a schedule speed outside of the towns as low as 38 miles per hour and still commence the return trip on time. Limited cars are to

make only one stop in each town along the line, and in two towns only do they enter the streets, at all other places they are on their own right of way. The speed proposed is, therefore, easily within reach without excessively heavy equipments.

The tests published by Clarence Renshaw in the Oct. 4, 1902, issue of the STREET RAILWAY JOURNAL, are of the greatest value, and the Union Traction Company, of Indiana, and the Westinghouse Company deserve the thanks of all railway engineers for their liberality in publishing the results of their investigations.

Without going into the details of Mr. Renshaw's paper it appears from his figures that for our service on the D, E & F Railway a motor having a square root of the mean square ampere capacity of about 45 amps. should be adopted. There should be four of these motors per car, and they should be geared to a maximum speed of 48 miles to 50 miles per hour, with an average line potential of 500 volts.

The selections of a suitable motor of this rating lands the engineer in the middle of the controversy as to railway motor rating. Unfortunately motors are still made and sold by their rating in "horse-power." The method of testing motors on the stand with covers off serves an admirable purpose in comparing the performance of one motor with another, and that is all. It is difficult to see what relation such a test can have to service conditions. Even the method of reading temperatures is in doubt. A motor may run for one hour at a certain load and a thermometer will then be placed at some point of its surface. Sometimes the thermometer has to be read at a most acute angle to make the results agree with expectations. A temperature reading by the resistance method might reveal some of the hot secrets which the thermometer conceals.

It is only necessary to mention as a case in point the well deserved reputation which the General Electric 57-motor enjoys among railway men. Its popularity is no doubt due in good part to its ability to radiate heat, yet a one-hour stand test gives absolutely no clue of what it has been able to accomplish in service. For our purpose, therefore, we will select a motor having the capacity to carry without excessive heating 45 amps. to 50 amps. for a run of six hours to eight hours and not call it by any particular horse-power. Commercially its rating may be anything from 50 hp to 75 hp.

A car equipped with four motors of this size will give most excellent satisfaction, but will not permit the acceleration which is being so much exploited of 1.5 miles to 2 miles per hour per second, and there is no particular reason why such an acceleration should be demanded on a road which is not expected to earn over \$6,000 per mile of track. In cases like elevated roads, with their gross receipts from \$40,000 to \$90,000 per mile, any acceleration, positive and negative, which the passengers will stand, is warranted almost regardless of cost. When the headway between trains is thirty minutes to sixty minutes there is a good opportunity for sandwiching a "limited" car between the locals. To do so, however, it is necessary to employ the methods which have enabled steam railroads to accomplish the same thing. Their system is the outcome of years of experience and has cost them millions of dollars. It is free to be adopted by any electric road. Some of them have adopted it, others are paying for not having adopted it.

Local service is to be given by the same type of car exactly as the limited service, and as the cars are not geared very high the numerous stops of such a service may be made economically, as is shown in Mr. Renshaw's figures. In not gearing the cars as high as has become customary we have in mind the fact that all limited trains will consist of two cars each. If we accept the train resistance figures as published by W. J. Davis, Jr., in the STREET RAILWAY JOURNAL of May 3, 1902, as a result of tests on the Buffalo & Lockport road, then it appears that a 35-ton car at 47.5 miles per hour has a train resistance of 35 lbs. per ton, and a multiple-unit train consisting of two such



cars should, according to the same figures, be able to make a speed of 62 miles per hour with approximately the same power consumption per car. Mr. Davis' figures, whether unconsciously or not, furnish a pretty good argument for operation of cars in trains.

Having already decided on using the multiple-unit system of motor control, there remains only to choose between automatic and hand acceleration. This can best be decided by referring to a certain well-known road using the multiple-unit, hand control system. Its cars are supposed to take 800 amps. per car when accelerating, yet, in the face of all attempts to check motormen, the accelerating current is much more frequently 1200 amps. than 800. Hand control introduces a factor of human unreliability which can best be met by automatic feed of the controller, independent of the motorman's judgment or lack of judgment.

To sum up we have determined on cars of a length of say 56 ft. over bumpers, width, 8 ft. 10 ins., which, with equipment, will weigh about 32 tons each. The schedule calls for ten cars in service. As we are not now preparing for any heavy excursion business and the schedule adopted is liable to be the maximum service which will be operated for some time, it is not necessary to purchase a heavy excess of cars. Probably twelve cars will be sufficient to purchase at once, but in our estimates we have allowed for fourteen passenger cars, giving a reserve of four cars above schedule requirements.

In addition to the fourteen passenger cars, of which two only need to be combination baggage cars, it will be advisable to purchase one baggage and express car without seats for passengers and with two side doors on each side and wide end doors; this car to be equipped electrically exactly like the passenger cars and geared for the same speed so that it may be attached to a local and used to pick up milk cans and express freight along the road, or it may be attached to a limited train for the transfer of through baggage or the scenery of theatrical troupes and similar services.

There is also a locomotive to be provided, equipped with the same size of motors as passenger cars but geared for a speed not exceeding 25 miles per hour. This to be used for moving carload freight, as work car, wrecking car, etc. In the winter it can be fitted with a "nose" and used as a snow-plow. As already pointed out there are no cuts of any depth and no additional snow equipment will be needed.

#### CAR SHOPS

For the proper maintenance of cars and their equipment proper shop facilities are absolutely necessary. As there is always much machine-shop work to be done during the construction period, a shop properly equipped before construction commences will pay for itself, and is then, when it is most needed, ready and in working order. It is, therefore, recommended that the D, E & F erect and equip its shop ahead of all other work. These shops should be located adjacent to the power station for economical reasons, as will be shown among power station items.

It is not necessary to erect expensive buildings of a capacity large enough to hold all cars. Shop room for four cars will be sufficient in our case. A separate room holding one car each should be provided for paint and carpenter shop, and the machine shop should have room for two cars. On a road of this character the amount of car painting is very little, and the paint shop may be fitted up to serve as a washroom in the winter time. In the summer the washing may be done outdoors.

The machine shop should be provided with hydraulic wheel press, wheel lathe, one or two small engine lathes, drill press, grindstone and emery wheels, universal shaper, power hack saw and overhead traveling crane of 2 tons capacity. Such a crane will not lift car bodies and it is not intended to do so,

as jacks are to be used for this purpose. The carpenter shop is to be fitted with a band saw, small planer and other pieces of the simpler woodworking machinery. The whole shop should be fitted up so that it may serve as a repair shop for the power house apparatus, and, in fact, do all the repairing and small construction required for the entire system.

#### POWER STATION

For a preliminary computation of the power required for the D, E & F Railway it is again convenient to refer to Mr. Renshaw's paper. His results show that it is cheaper to transport passengers with limited cars than with local cars, and from his results and similar figures obtained on other roads we are perfectly safe in assuming an average consumption of 75 watts per ton mile in limited service and 90 watts per ton mile in local service. As there are six cars of thirty-two tons each on local service and four cars of the same weight in limited service it follows that the average kilowatts per hour may be estimated very closely to be 690 at the cars. The average losses from power station to car, including third-rail losses, should not exceed 15 per cent; for safety, we assume them as amounting to 20 per cent. This would give an average demand of 828 kw per hour on the power station.

It is quite well known that in power stations supplying inter-urban roads of few but heavy cars the momentary load factor or the ratio of average load to maximum load is very low. It is often as low as 50 per cent, and rarely over 65 per cent of the capacity of the apparatus in operation. To supply an average of 828 kw would, therefore, require at least 1200 kw of machines in operation, and would then at times heavily over-tax the apparatus. The boiler and engine economy is not as high as it should be in such a case, and in order to increase the station economy it is necessary to smooth out the load fluctuations, which is best accomplished by the use of batteries. In addition to their utility in this capacity batteries have in our case the advantage of practically furnishing a reserve unit at sub-stations, of enabling repairs on the high-tension line to be made without stopping cars, furnishing all-night current for the moving of carload freight by the locomotive before referred to and enabling a satisfactory lighting service to be maintained; also of furnishing power for the all-night lighting service. The chief disadvantage of the battery is its high first cost, but this disappears when it is bought and installed as an integral part of the motive power outfit when the road is first being organized. It is not often realized that the cost of a properly proportioned battery or set of batteries is less than the cost of the additional boilers, engines, generators and sub-station apparatus, etc., which are made unnecessary by its use. It is a safe guess that it is this feature of the battery which causes the representatives of most machinery manufacturing concerns to be so radically opposed to its use. On the question of maintenance there is now sufficient data available so that no one need grope in the dark, and its efficiency, when used simply as a regulator of load fluctuations, is very satisfactory.

We may, therefore, proceed to organize our power house with the understanding that batteries shall be used as regulators and the batteries placed at sub-stations. We have already determined the average demand on the power station with the ten-car schedule, shown in Fig. 2, Chapter I (*STREET RAILWAY JOURNAL*, March 7, 1903), and in order to have the 828 kw available it will be necessary to operate approximately 1000 kw at the power station. This is in excess of the average demand, but as there will be a demand for lighting and power service at the small stations along the road if this business is properly followed, and there is an occasional extra car, the 1000 kw available will furnish a very convenient unit, and the occasional fluctuations in current, which are present even when a battery is used, will be easily met by the over-load capacity of generators and engines.

How should this demand be met—by 1 unit of 1000 kw or by smaller units? It is taken for granted that some sort of reserve capacity must be provided, and the problem would be met in many cases by installing two 1000 kw units. The writer believes that three of 500 kw each would be more advisable and so recommended. The flexibility of three units as against two is worth something, and the first cost for the three smaller equipments is less than the first cost for the two larger units, that is, the idle investment is reduced. There are also three to four hours each day when not all of the cars are in service, and one of the 500 kilowatt units can then carry the load at high efficiency.

The location of the power station is determined by the available water supply, and in the D, E & F Railway has to be placed at one extreme end of the line. Theoretically the location would be more convenient near the center of the line in the neighborhood of E, but no suitable water supply was available there.

It was recommended that the car shops should also be located wherever power stations might be built. The object of this is economy in operation. One master mechanic may have charge of station and shops. Steam, compressed air and water supply from the shops become easy and inexpensive, and the exhaust steam from station auxiliaries may be utilized for heating the shops in the winter time. For the same reason it is recommended to build a general office building in a convenient location near the station and shops. Aside from the saving in rent gained by a building of this sort its heating and lighting become inexpensive, as they are accomplished by by-products of the power station and the executive heads of the property are within reach of the "heart" of the road.

In this as in many other cases the station and shops would be located outside of city limits, well in the country, where available houses for occupancy by employees are few and rather undesirable. This is often the cause of dissatisfaction, and more often the most desirable class of employees cannot be obtained at all when accommodations are scarce. Again this condition usually results in employees living some distance away from the station and shops or even in the heart of the city. When emergencies arise, as emergencies will, and an extra force of men is needed, it is usually difficult to get the men together in anything like reasonable time. It would seem a good investment, therefore, for the railway company, as a company, or its stockholders as individuals, to build a suitable number of convenient small houses supplied with steam-heat, electric light and water from the station, and rent these to employees, charging a reasonable rent and allowing only employees to occupy them. Wherever such a plan has been tried it has invariably been found to work to the advantage of the company as well as employees. Its chief advantage, in the writer's opinion, is that it furnishes a trained emergency force on short notice. A secondary advantage is the income derived from the station by-products, which is, of course, included in the rent received.

Planning a station with these objects in view one may with profit adopt steam-driven auxiliaries, and leave out many of the troublesome automatic contraptions which are supposed to add one-half or 1 per cent to the station economy, and actually entail an increase of 20 per cent to 25 per cent in the repair account. It is not within the province of this article to discuss the details of power station design; there is already too much controversy on that subject. A few engineers seem to lose sight of the fact that the station is a means of an end only and not the chief object of building a railway. As a general rule, and for the station as proposed by the D, E & F Railway, simplicity is recommended. A general specification would include a gravity coal feed from cars to furnaces, automatic stokers, water-tube boilers, forced draft, steam-driven feed and vacuum pumps and electrically-driven rotary circulating pumps.

At the present time one must consider carefully the installation of steam turbine-generator sets in the engine room. No doubt their use is increasing, but as the prices asked at the time this report was written seemed to be out of proportion to the size of the units and their maintenance as yet an undetermined factor, three engines of 750 hp each were recommended. In a road of this character, whose finances promise to require careful nursing in order to make ends meet, and whose power equipment is just large enough to meet the demands, it is best not to take large chances in vital parts of the plan.

The generators are recommended to be wound for 450 volts, three-phase 25-cycles, and the current carried to the switchboard and handled at that voltage. Several very modern plants of recent design have the switchboard on the high-tension side of the transformers, and there seems to be a tendency to follow this practice. Its advantages are many when the current is generated at high voltage in the machines and it is desirable to take the current from machines to lines with a minimum of high-tension wiring. When the line voltage is beyond the limits of generator voltage then it seems that the introduction of the switchboard in the high-tension side of step-up transformers incurs a large amount of unnecessary expense and complication of apparatus, and it seems, moreover, that such practice is out of place in a plant such as we are considering. In order to simplify the station wiring it is also advisable to locate the switchboard on the station floor and avoid the annoying and expensive switchboard gallery, which has no "raison d'etre" except in the very largest power stations. In this connection it is well to observe the practice of handling high-tension currents in use in the power transmission plants on the Pacific Coast, where longer experience has been had than elsewhere in that particular class of work. They handle currents almost exclusively from the low-tension side, and give excellent reasons for so doing, and the practice of using complicated and expensive high-tension switching devices has few advocates among those concerns, which have made the business of power transmission what it is.

As in our case the distance of transmission is over 50 miles, it is advisable to step up to the highest voltage which has proven commercially practicable in this climate, approximately 33,000 volts. The electrical station plant then would consist of three 500 kw, 450-volt direct-connected units, switchboard at 450 volts, and three sets of step-up transformers, one set for each generator, connected to a single 33,000-volt outgoing feeder through simple, hand-operated high-tension switches.

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### PARCEL CHECKING AT TOLEDO

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Mention has been made already in these columns of the unusually fine waiting room at Toledo and of the parcel checking system in vogue there. The checking system has proved especially acceptable to interurban passengers, and was made great use of during the holidays. The system is briefly this:

A large number of boxes are provided in a baggage room at the rear of the newsstand in the interurban waiting room. These boxes are built around the edge of the room in tiers, like the storage boxes in a store room. Each box is numbered. An interurban passenger, upon arriving in the city, can rent the use of one of these boxes for 5 cents a day. Upon payment of 5 cents to the attendant at the newsstand a check corresponding to the box number is given. Any purchases made around town may be sent to that box number at the interurban waiting room. The shopper, therefore, does not have to load herself down with small parcels which must be carried around from store to store. She can have everything sent to her box in the interurban waiting room, and when she goes there to take her car her purchases are in the box ready for her.

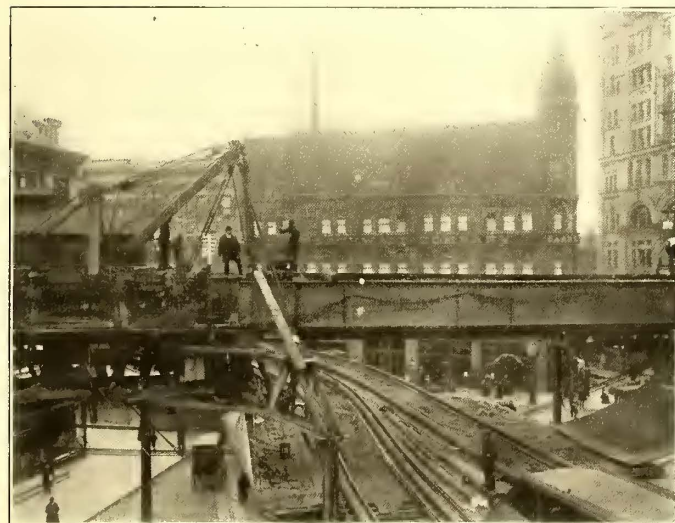
**SOME INTERESTING WORK ON THE BROOKLYN ELEVATED**

An interesting piece of engineering work was recently done by the Brooklyn Rapid Transit Company on its elevated lines. At the junction of Fulton Street and Hudson Avenue, near Flatbush Avenue, the Fulton Street line, or old Kings County Elevated structure, crosses the Fifth Avenue line of the old



SOUTHBOUND TRACK COMPLETED

Brooklyn Elevated system, the Fulton Street line being above the other. The distance from the head of the rail on the lower track of the girders which formed the bridging span, was formerly about 13 ft., a slight grade making the southern end of the span a small distance higher. This clearance was amply

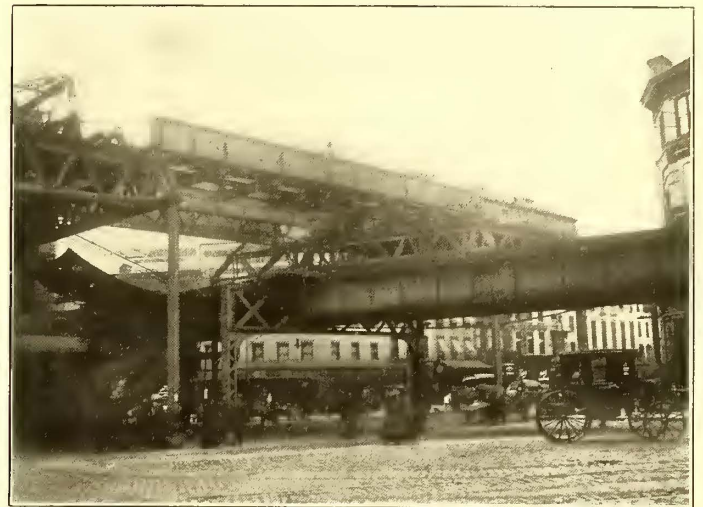


PLACING ONE OF THE GIRDERS

sufficient for the operation of the steam locomotives on the lower track, but would not permit the equipment of the new motor cars with trolley poles. The result has been that the company has been obliged to fit the trail cars with trolley poles instead of the motor cars. It has been impossible, therefore, to run on the Fifth Avenue line single motor cars which were originally intended to descend to the surface by means of the incline at the Thirty-Sixth Street station. This made it necessary to change cars at this point for the Bath Beach, Bensonhurst and Coney Island service. An incline is now being constructed on the end of the former Sixty-Fifth Street terminal of this elevated line, and through electric trains may be operated to Fort Hamilton. In all the surface work of

the Brooklyn Rapid Transit Company overhead trolley wires are used, so that it is necessary to have trolley poles on the elevated cars whenever they are expected to run on the surface.

The lack of clearance at the junction of Fulton Street and Hudson Avenue, therefore, interfered with the operation of through trains to the suburban points mentioned above, and in order that such a service might be started next summer the engineers of the road designed a girder of somewhat novel type to replace the girder of the Fulton Street Elevated at the crossing point. The method by which the substitution of one set of girders for the other was accomplished is illustrated in the accompanying engravings. The Fulton Street line is double-tracked, and the span over the Hudson Avenue line is 63 ft. 10 ins. on one side and 53 ft. 3 ins. on the other. The girders for each track were changed separately, all trains using the opposite track during the operation. Cross-overs near the span on each side enabled the trains operated on the track where the substitution was being made to cross the span on the other track. No interruption of service, therefore, took place on the Fulton Street line. Two derrick cars were used in removing the old girders and putting the new ones in place. A car was



GENERAL VIEW OF CROSSING

placed at each end of the span, and the new girder was easily substituted for the old one.

The girders formerly used at this point were of the old lattice type used on the rest of the structure, but placed above the track. The bottom of the girder, however, was about the level of the floor beams, so that a solid horizontal line determined the clearance. The bottoms of the new plate-girders, on the other hand, are at the top of the floor beams, as shown in the engraving in this column. In this way, although the clearance between the track and the bottom of the floor beam is still about 13 ft., the clearance between the lower track and the girder is 14 ft. 2¼ ins. The floor beams are, of course, so placed that there is ample room between them for the passage of the trolley pole, and although the track of the upper structure remains at the same level, there is an additional clearance of 14 ins. obtained. The construction of the track supports is rather interesting. A channel is laid along the floor beams the entire length of the span, to which the rail is fastened by means of hook bolts placed at frequent intervals. To the turned-up edges of this channel are riveted angle-irons so as to form flanges along the side of the rail. This construction gives a solid steel trough for containing the rail, and not only furnishes a rigid foundation but acts as a guard-rail along the side of the track. The third rail is not continued over the span, but the length of the train is sufficient to take current from one side or the other while the train is passing.

### BROOKLYN'S SUBWAY PLANS

The development of rapid transit facilities in the Borough of Brooklyn and the improvement of transportation methods between that borough and Manhattan formed the subject of a comprehensive report by William Barclay Parsons, chief engineer of the Rapid Transit Commission, which was submitted to that board last week.

The plans, briefly summarized, provide for the building of 37 miles of new road and 120 miles of new track, at a cost of about \$52,000,000; a second East River tunnel, from Maiden Lane and William Street, through Center Street, connecting the Brooklyn, Manhattan and Williamsburg Bridges and reaching to Orange Street and Nassau Street, Brooklyn, the latter being the terminal grade of the new Manhattan Bridge; a four-track subway from Flatbush Avenue and Atlantic Avenue to the Prospect Park Plaza and along Eastern Parkway, and a two-track subway through Flatbush Avenue to East Broadway; a combination subway and elevated line from Flatbush Avenue and Atlantic Avenue along Fourth Avenue to Fort Hamilton, with a tunnel connection from Atlantic Avenue to Whitehall street, Manhattan; extra tracks for express trains on the Fulton Street, Broadway, Myrtle Avenue and Fifth Avenue lines; an extension of the Fulton Street elevated road to near Hollis, in Queens, and a connection between the Fulton Street and Flatbush Avenue lines in the shopping district; a new elevated line from Franklin Avenue and Fulton Street, through Franklin Avenue to Wallabout, Gwinnett Street and Lorimer Street and Manhattan Avenue to Long Island City, with connections for the Williamsburg and Blackwell's Island Bridges.

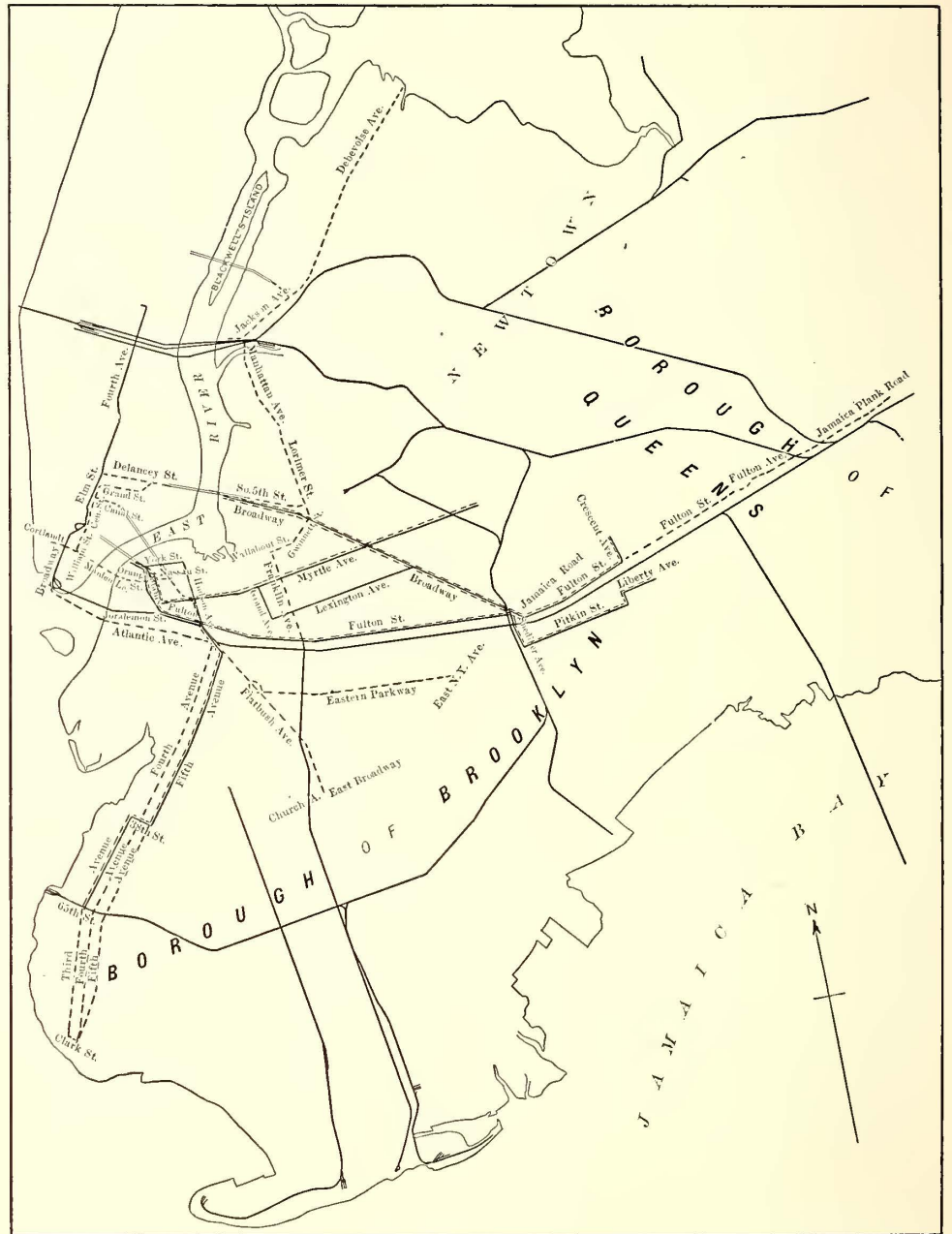
The report urges the restoration of the present bridge to its original purposes by the elimination of the elevated service from this structure entirely, and transferring the surface tracks to the space now occupied by the elevated trains. The following abstract from the report contains the salient features of the recommendations:

#### SUBWAY AT MAIDEN LANE

In connection with the Brooklyn end of the Manhattan Bridge, the city authorities propose to construct a new thoroughfare along the axis of the bridge produced to the intersection of Fulton Street and Flatbush Avenue. Such a street intersects or reaches all the elevated lines now running to the Brooklyn Bridge. When the Manhattan Bridge is completed spurs from the elevated lines will be run over the bridge. The topography of the ground in Brooklyn is such that a connection can also be made with every elevated line, so that it will run into a subway without serious interference with cross streets. Such a subway can be carried under Nassau and Orange Streets and the East River to Maiden Lane in Manhattan, with a station near William Street. From this station one line can run across the city via Cortlandt Street to West Street, and another line along William Street, diagonally under the present bridge structure to Park Row, thence to Center Street, to Grand Street, and then under private property to the end of the Williams-

burg Bridge at Delancey Street, where, with but little alteration in the bridge structure, the subway tracks can be connected with the elevated tracks on the bridge.

This will provide a loop for the elevated railways of Brooklyn by way of the Williamsburg Bridge, and this second Brooklyn tunnel. With this subway a similar connection can be made with the elevated tracks on the Manhattan Bridge, when the latter is completed, thus providing a second loop. This subway should have two tracks everywhere, except along Center Street, where there should be four. Stations could be at William Street, Fulton Street, Brooklyn Bridge, Worth Street, Canal Street and Grand Street, and at Church Street and West Street on the Hudson River



MAP OF RAPID TRANSIT EXTENSIONS PROPOSED FOR BOROUGHS OF BROOKLYN AND QUEENS IN REPORT OF CHIEF ENGINEER PARSONS

Proposed lines shown dotted; present lines shown solid

branch. As the delays due to cross switching at the terminal would be done away with, more elevated trains and longer ones could be run through the tunnel than on the present bridge, and by providing the above-named stations, or others equally convenient, Brooklyn travelers would be delivered at six stations, instead of one, as at present, and be distributed along the whole length of the east side of the commercial district in through trains at a single fare (also at two stations on the west side).

#### BROOKLYN'S SUBWAY SYSTEM

This system now terminates, according to Contract No. 2, at the intersection of Flatbush and Atlantic Avenues, where a connection can be made by transfer or otherwise with the trains of the Long

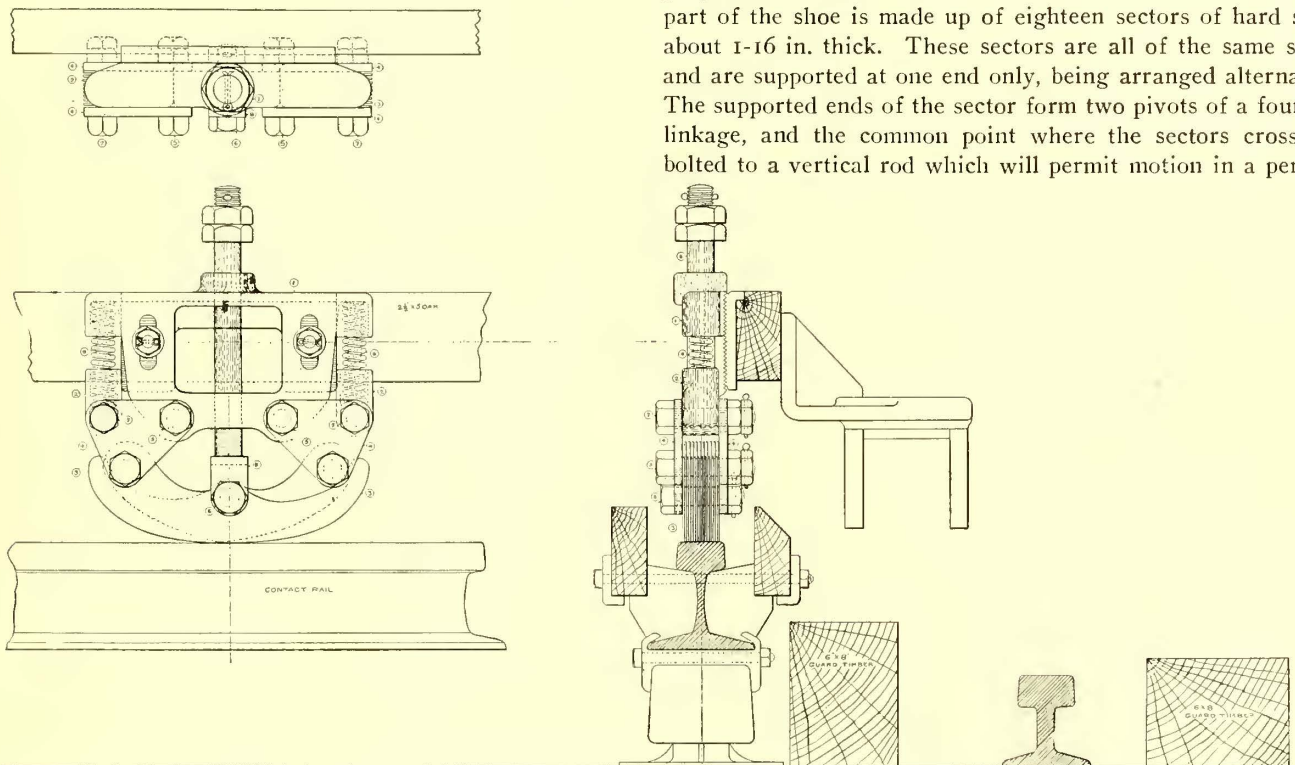
Island Railroad, and by means of the Atlantic Avenue improvement, now in progress of construction jointly by the city and the Long Island Railroad, and so provide means of reaching the easterly limits of the Borough of Brooklyn. From the present terminus the subway system should be extended under Flatbush Avenue, with four tracks to the Prospect Park Plaza. Around the outer limits of the Plaza I propose a loop, and diverging from this loop a three-track line easterly along the Eastern Parkway to, say, East New York Avenue. Two of the tracks on Flatbush Avenue should be depressed at the Plaza, and then be carried southerly along Flatbush Avenue to, say, East Broadway. It is interesting to point out that these proposed subways, if constructed, will connect the great park systems of the city of New York, from Bronx, Pelham and Van Cortlandt Parks on the north, passing Central Park in the middle, and reaching Prospect Park on the south. Another extension of the subway could begin at Flatbush and Atlantic Avenues, running south along Fourth Avenue to Fort Hamilton, probably becoming elevated at some point where the topography would allow.

When these lines are carried into execution and the traffic that they would produce has been developed, it is obvious that some further connection will be necessary in addition to the Whitehall-Joralemon Street tunnel. It would seem that the best route for

transfluvial transit will in themselves provide the greatest single measure of relief that Brooklyn stands in need of; there remains, therefore, but to propose and to carry into execution as rapidly as possible certain extensions of the rapid transit facilities in Brooklyn, which will be rendered possible by the increase in the terminal facilities in Manhattan. These extensions should obviously be of two characters—one, the extension of the subway system wherever such extensions can be made economically, and become an integral part of the railway system which the city has already begun; the other, extensions on such terms as the board may determine of the elevated lines of the Brooklyn Rapid Transit Company, in order that such company may more properly fulfill its obligations. The first of these extensions will obviously require time; the second, however, can be more quickly executed, and consequently is the one to furnish immediate relief.

COMBINED COLLECTOR SHOE AND SLEET CUTTER

The accompanying illustration shows a new type of collector shoe for third-rail roads, designed and patented by George T. Hanchett, of New York city, and intended to fulfill the double purpose of a current collector and a sleet cutter. The working part of the shoe is made up of eighteen sectors of hard steel, about 1-16 in. thick. These sectors are all of the same shape and are supported at one end only, being arranged alternately. The supported ends of the sector form two pivots of a four-bar linkage, and the common point where the sectors cross are bolted to a vertical rod which will permit motion in a perpen-



SLEET CUTTER FOR EXPOSED THIRD-RAIL OPERATION

such a tunnel would be Atlantic Avenue to Whitehall Street. Such a tunnel would permit connections being made, not only with the South Brooklyn line, but the East and Southeastern Brooklyn lines, besides serving an already well populated district in Brooklyn. The Atlantic Avenue line could be connected with the line that I have proposed to the board, running south along Church Street, provided such a line is constructed.

EXTENT AND COST OF IMPROVEMENTS

The total number of miles of new road proposed by this report is thirty-seven, and the total amount of new tracks proposed, whether in new road or as additions to existing roads, is 120 miles. An approximate cost of these improvements, exclusive of abutment damages, is about \$52,000,000, of which about \$31,000,000 represents the approximate estimated cost of extending the subway and of constructing the second tunnel with its Center Street connection in Manhattan. If the board approves the suggestion that is contained in the report that the extensions of the subway and the new tunnel with its connections should be undertaken as municipal construction, the latter figure will represent the cost of so doing.

Should the plan described be carried out, the Borough of Brooklyn will then be connected with the Borough of Manhattan by three bridges carrying six elevated tracks and ten surface tracks, and two tunnels carrying four tracks, every one of which tracks will have a greater carrying capacity than either one of the two elevated or two surface tracks on the existing bridge. These increased facilities of

dicular direction only. This joint is a loose one and will permit each sector to have an individual motion of about 1/4 in. Pressure is applied to the four-bar linkage by means of two spiral springs, which bring pressure on a triangular extension of one of the links and strive to open the linkage. When the shoe is off the rail the spring pressure will succeed in opening the linkage to such a point as the nut and check nut on the central bar will allow the shoe to descend. This is, of course, adjustable and fixes the lift of the shoe.

The individual motion of the plates prevents the entire shoe from being lifted by a single particle of ice, which is what happens when the ordinary light, flat slipper is used. In other words, the sharp edges of the sectors enable them to cut through the sleet after the fashion of a series of knives, thereby avoiding the action of the ordinary shoe in sliding up over such obstructions like a snow-shoe.

The connecting lead can be bolted anywhere on the casting, preferably at the point marked "1." No flexible connections are required because the linkage joints are all held in tight contact by springs. This shoe is now being tried on one of the cars of the Manhattan Elevated Railway in New York.

## CORRESPONDENCE

## STORAGE BATTERIES IN SUB-STATIONS

MICHIGAN ELECTRIC COMPANY

Detroit, March 10, 1903.

EDITORS STREET RAILWAY JOURNAL:

My attention has been called to your editorial on first page of your issue of March, entitled "Storage Batteries in Sub-stations."

I believe the subject of storage batteries for use in connection with the interurban road using alternating current transmission is not as thoroughly understood and considered as is warranted by the facts, but I question the initial investment being any less with machinery and batteries used in proper combination than equipments consisting of machinery alone. The total investment is generally, I believe, about the same; the operating expense, however, of roads using batteries in combination with machinery is materially less than of roads using machinery alone, and the reliability of service is greater.

Regarding your assumed condition—a storage battery of 100-kw capacity to be installed in a sub-station permitting the saving of a corresponding capacity of rotary converters and step-down transformers—that is beyond question; but going back to the power station, instead of the 100-kw battery at the sub-station permitting the reduction of engine, generator and boiler capacity by over 100 kw, the reverse is true, as such a battery would not permit of saving even 100 kw, unless no rotaries were in the power house, and only one sub-station was connected therewith, in which event it would permit the saving of just 100-kw capacity in power house equipment.

Where, however, as ordinarily is the case, two, three or even more sub-stations are connected with the power house, the load on the power house shows less fluctuations than the sum of fluctuations on the sub-stations. From average conditions I find the sub-station machinery equipment can be cut down from 50 per cent to 66 2-3 per cent if batteries are used, and the main power house from 25 per cent to 33 1-3 per cent; the total saving of the power house and sub-stations thus made by reducing machinery equipment is about equal to the cost of batteries required to take their place.

I do not consider the importance of this question is any less than as indicated in your editorial. But as its effect in cutting down the machinery equipment is different from what you state, I simply wish to call attention to that fact, and to emphasize the point that the advantages derived from the use of batteries in connection with railways using alternating-current transmission, lie in the improved economy and reliability of operation rather than in any reduction of initial cost.

Jos. E. LOCKWOOD, President.

## BRAKING ON THE TREAD AND FLANGE

Allegheny, Pa., March 10, 1903.

EDITORS STREET RAILWAY JOURNAL:

I have given considerable practical attention to the subject of brake-shoes and their attachment, and I believe that better results in braking would be secured if all the braking were done on the tread of the wheel instead of the flange. One effect of the use of a flange brake-shoe is that the sand which is carried up by the wheel collects at the root of the flange, causing unequal wear and hard braking. Another effect is that where the flanges are clipped they will catch the shoes suddenly and cause the brakes to buck. I believe that if the flanged portion of the shoe were omitted entirely this difficulty would be obviated and there would be fewer flat wheels. If the flanged end of the shoe is considered desirable for steadying the brake-shoe it can still be used but made with a deeper opening so that it will guide the shoe without braking the flange.

WILLIAM E. STEINHAUSER.

## CAR SEAT COVERINGS

Cleveland, March 17, 1903.

EDITORS STREET RAILWAY JOURNAL:

Mr. Gonzenbach's views on the most desirable material for car seat coverings are evidently shared by a large number of managers of interurban railway properties, but experience does not support his claims. Just why plush should be selected for this service is beyond my comprehension, and the only explanation that suggests itself is the fact that it "gives the car the air of a Pullman," as was boasted by the superintendent of a line running through a section of the country where the natives were awed by the gorgeous elegance of sleeping-car porters. There is no doubt that plush coverings catch and hold dirt and dust, and that they are harder to clean than rattan, leather or some such special composition as pantasote. It is equally true that most interurban lines have dusty roadways, and that during the summer particularly women dislike very much to ride in cars with plush seat coverings, because of the damage to their dresses of light material, which become easily soiled by contact with dusty seat backs. Then, too, plush coverings and heavy draperies in cars, as in homes, make the compartment look hot and stuffy and altogether uninviting—conditions which should be studiously avoided by transportation managers where patronage is so easily affected by adverse conditions.

The small boy is much more likely to climb upon a seat to look out of the window during a long ride in an interurban than in a short trip over a city line, and he is liable also to leave the imprint of his muddy shoes upon the plush seat. On the other hand it must be admitted that the tendency to cut a slit in a leather covered seat seems to seize many patrons of interurban lines which are finished in this manner. There are some objections to the adoption of any of the coverings now on the market, but the drawbacks to the use of plush seem to outweigh those that apply to other forms.

INTERURBAN.

## THE STREET RAILWAY SYSTEM OF HAVANA

The Havana Electric Railway Company is the largest street railway company in Cuba, and controls all the electric lines in operation in Havana. Under its Spanish charter it has a monopoly of the street railway transportation in the city. It charges 5 cents Spanish silver for fare and gives free transfers. It operates twelve lines of cars and has 36 miles of track, not including 2 miles in switches and car houses. It has 400 employees and operates 110 cars. Fifty new cars have just been secured from the Niles works, and the company is planning to build some more in its own shops. The new cars are mounted on McGuire trucks and are equipped with General Electric motors.

The company has made no extensions since the publication of an article on the system in the STREET RAILWAY JOURNAL of Aug. 4, 1900, except at Jesus del Monte, where 2 miles of tracks were added last year at Vibora, where a steel frame car house was built, with corrugated iron roof, and a section of 2 miles on the Twenty-Third Street line. Extensions are planned in the city of Havana, however, 6 miles in length.

The system of the Havana Electric Railway Company is operated by the double trolley, and the cars are equipped with General Electric motors.

Across the Bay of Havana are the suburban towns of Regla and Guanabacoa, which were great resorts during the Spanish regime. At the entrance to the ferry that connects them with the city is a trolley line named after the cities through which they run. The line has the double overhead trolley, is 3 miles long and has eight cars in the service. The fare, including ferriage, is 10 cents Spanish silver, and the time consumed

from Havana to the end of the line is forty minutes. The general manager of the company is George F. Greenwood, who is also manager of the Havana Electric Railway Company, but the company has its own power station and is distinct in every way from the Havana company. This line runs through a fine section of suburban country near Havana, and is said to be making money.

A third line which might be mentioned in this connection is that of the Concha & Marianao Railroad Company. This is a steam railroad, which runs from Principe in the city of Havana to the town of Marianao, some 8 miles away. It has also a side line from Marianao to the Playa, a great resort for the Havana people, as it has a fine bathing beach in a sheltered bay. Some time ago the company obtained permission to install electricity as a motive power, and the subject is now under consideration. As the Havana Electric Railway Company, however, has a monopoly of the city business under its charter, the introduction of electric power on this line is problematical. The fare at present is for first class 20 cents, and third class 10 cents, Spanish silver.

A new trolley line known as the Havana & Jaimanitas Railway Company was organized about a year ago, but construction has not yet been commenced. This company was organized by capitalists from Youngstown, Ohio; Cleveland, Cincinnati, Chicago and New York. The capital was originally \$2,500,000, but this has been increased. The carrying out of its plans would mean the opening up of some of the finest cane and tobacco lands in the western end of Cuba, in Havana and Pinar Del Rio Provinces.

Another interurban system projected is that of the Insular Railway Company, which has been organized under the laws of the State of New Jersey, with a capital of \$2,500,000, and is controlled by the same persons who are interested in the Havana Electric Railway Company. This company is planning to build about 170 km (about 100 miles) of track to serve as a light railway throughout the province of Havana, and to connect that city with Mariel, Guines and other important places. The line will be equipped with a double trolley, and through cars will be run from Havana. Six miles of track have already been graded. The road will be built on its own right of way, for which a width of 30 m (100 ft.) have been secured. A draw-bridge over Almendares River has already been built.

### A NEW THIRD-RAIL INSULATOR

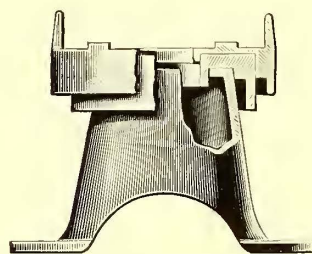
A simple, reliable and satisfactory insulating support for the contact-rail on third-rail roads is one of the details in construction work that has attracted the attention of engineers engaged in that line of railway construction. Several devices of this kind have been described in these columns, but no extended particulars have been published of the insulator designed for the Aurora, Elgin & Chicago Railway Company by Ernest Gonzenbach, constructing electrical engineer of that line, and which is a radical departure from all previous efforts. Illustrations of this device are shown in this article, and it will be noted that it embodies several new features.

It consists of but three pieces, which are not fastened together in any manner, but they are kept in their relative position by the weight of the contact-rail. For an insulation Mr. Gonzenbach employs a standard compound, which is practically the same as that used on regular overhead trolley fixtures.

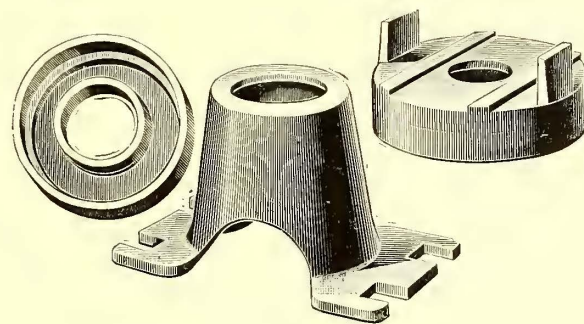
The principal difference in this compound is that it is much tougher and of greater tensile strength, due to the introduction of a specially prepared fibrous material. This insulation, which is in the form of a ring or inverted cup, is so placed that it is out of reach of all mechanical injury, shocks or strains. The

shape of this insulating ring is such that there can be no shearing strain on any of the insulation, and the only strain it is subjected to is that due to the weight of the rail, which does not exceed 50 lbs. per square inch even with the heaviest rail.

In view of the fact that compound insulations of this character are used in overhead work under constant strains of about 1000 lbs. per square inch and over, the margin of safety is very large in this third rail support. The base casting and the insulating ring, being both of considerable diameter and extending over almost the entire surface of the rail base, it will be seen that movement of the rail over this support, due to expansion and contraction, cannot exert any leverage or strain tending to break the insulation, as is the case in other types of supports. As the three parts of the device are entirely separate and not held together by anything but the weight of the rail, there is no tendency for the contact rail to drop with any slight sinking of the ties as the car passes. The result is that there



THIRD-RAIL INSULATOR



PARTS OF THIRD-RAIL INSULATOR

is no corresponding strain upon the insulating support, as the metallic rail-cap holds fast to the rail and the under portion of the support follows the sinking motion of the tie. Provision is made in the insulator for a 1/2-in. movement of this character, and this can be made even greater if desirable. The top cap has the usual lugs, which are bent over the heel of the rail with sufficient clearance to allow the rail to move without straining the cap longitudinally. The base shell and the rail cap are made of malleable iron.

The arrangements of skirts or petticoats on the insulating portion, as well as the rail cap, is one of the most important features of this device, producing, as it does, a third-rail support that is absolutely impervious to salt or lime commonly used to cut sleet and ice from the contact-rail during the winter season. That the insulator is not affected by this was shown during the winter just past on the Aurora, Elgin & Chicago Railway, where these insulators are now in use in large quantities, there being no trouble whatever on this road on account of salt or lime applied to the rail.

This insulator is being manufactured and sold by the Mayer & Englund Company, Philadelphia, and will be known as the "Keystone" third-rail insulator.

The law of negligence governing the standing on a platform of a moving street car in a municipality is not applicable to the case of standing on a platform moving of an interurban car in the open country, says the State Supreme Court of Ohio. The case was one in which George J. Lake recovered in the Lower Court from the Cincinnati, Lawrenceburg & Aurora Traction Company for the death of his son. The Supreme Court reverses the decision.

## LEGAL DEPARTMENT

CONDUCTED BY WILBUR LARREMORE, OF THE  
NEW YORK BAR

### FREE RIDES FOR POLICEMEN AND FIREMEN

In the year 1895 a statute was passed in New York State providing that the Mayor of each city in the State, and the president of each incorporated village, might issue to policemen and firemen appointed by the duly constituted authorities of such city or village, a certificate of appointment and qualification, specifying the duration of the term of office, and that "it shall thereupon be the duty of every street surface and elevated railroad company carrying on business within such city or village to transport every such policeman or fireman free of charge while he is traveling in the performance of the duties of his office." In *Wilson vs. United Traction Co.* (May, 1902, 72 App. Div., 423), the Appellate Division of the New York Supreme Court, Third Department, held that such statute was unconstitutional and void, as involving a taking of property without due process of law. The court relies to quite an extent upon *Beardsley vs. N. Y., Lake Erie, etc. R. R. Co.* (162 N. Y., 230) and *Lake Shore, etc., Ry. Co. vs. Smith* (173 U. S., 684). We think, however, there is a perceptible difference, if not a legal distinction, between the street railroad case and the authorities cited. In the latter, steam railroad companies were required to issue mileage books at a reduced rate of fare to those willing to purchase a designated number of miles at a time. It was held that such legislation was void, as depriving the railroad companies of property without due process of law. It will be noticed, however, that the statutory provision was for the benefit of the community at large; there was no element of public office or public service on the part of the passengers concerned. The Appellate Division, therefore, wisely considered the question whether legislation requiring street railways to carry policemen and firemen free was within the police power of the State. Upon this point the following language from the opinion of the Appellate Division, by Parker, P. J., may well be quoted: "It is sufficient to say that, in our judgment, the statute in question cannot be sustained as a valid exercise of that (the police) power. Its evident purpose and effect is to relieve the municipalities referred to therein from a portion of the burden of maintaining their police and fire departments at the expense of the several street railway companies within their limits. Concede that the public safety requires that the public officers mentioned be carried upon such railroads, it is not apparent why, in order to promote that safety, they should be carried free of charge. There is no pretense that the act is necessary to secure their right to ride upon such roads. The sole purpose is to secure their right to ride free. Thus the only advantages secured by the act to the public is that the railroad company instead of the municipality pays the fare. Such an advantage may be a public convenience, but the right to take the property of the individual citizen, or of a class, for the sole reason that the proceeds of it would be convenient to aid the municipality in defraying its general expenses, has not yet been conceded as a legitimate exercise of the police power, and we are not disposed to concede it now."

It is quite evident that such view was necessary to prevent gross oppression of the companies. The obligation to carry firemen and policemen would in itself constitute a very serious burden, and if such a law had been held valid we see no reason why it could not be extended to take in any person in the public service. The practical result is that, in the absence of actual prohibition or regulation, street railway companies may, in their discretion, allow a certain number of policemen or firemen to ride free, but that they have control of the privilege.

In the State of New York another feature enters into the problem, as Section 5 of Article 13 of the New York Constitution provides: "No public officer, or person elected or ap-

pointed to a public office, under the laws of this State, shall directly or indirectly ask, demand, accept, receive or consent to receive for his own use or benefit, or for the use or benefit of another, any free pass, free transportation, franking privilege or discrimination in passenger, telegraph or telephone rates, for any person or corporation, or make use of the same himself or in conjunction with another." The section further makes it a misdemeanor for any corporation, or officer or agent thereof, to offer or promise to any public officer any such free transportation, etc. It was held in *People vs. Rathbone* (145 N. Y., 434) that this constitutional provision covered notaries public. The opinion of the court insists upon the broadest interpretation of the language. The court remarks: "The only assumption that we have any right to indulge in is that it was made as sweeping in its terms, in order to prevent doubts and to obviate refinements of reasoning as to its application to particular cases under the varying conditions of our political life." Under this provision of the Constitution, as so interpreted, it would seem that policemen and firemen have been "appointed to a public office," and that the issue of free passes or the grant of free transportation to them by street railway companies, as well as other corporations, is illegal.

### LIABILITY FOR NEGLIGENCE.

IOWA.—Street Railroads—Premature Starting of Car—Appeal—Verdict—Evidence to Support—Conflicting Evidence—Review—Instructions—Refusal of Requests—Nursing—Services of Daughter—Value—Damages.

1. Where, in an action for injuries to a passenger by the premature starting of a street car, the evidence warranted a finding that the conductor knew plaintiff was attempting to alight, and, while seeing her in that attitude, permitted the car to start before she had safely alighted, a judgment for plaintiff will not be reversed on appeal for lack of evidence, though it also tended to show that the car had not stopped to discharge passengers, but in the middle of a block, to repair a wire.

2. Where, in an action for injuries to a passenger by the premature starting of a street car, the evidence was conflicting as to whether or not the car was in motion when plaintiff attempted to leave it, a verdict in her favor would not be reversed on appeal because of her alleged contributory negligence in attempting to alight while the car was in motion.

3. Where plaintiff was injured by the premature starting of a street car, an instruction that if the car was stopped near the middle of a block, and, while it was still, plaintiff attempted to alight, and was seen by the conductor either when she arose or when she was on the footboard, and while she was there the cars were started by the conductor, and she was thrown to the ground and injured, and the conductor, seeing her about to get off the car or on the footboard, started the car, and did nothing to stop it or prevent the starting, if he saw her attempt to get off before it was started, that was negligence, etc., was proper.

4. Where a physician stated that he knew the value of services for nursing, his evidence as to value was properly admitted.

5. In an action for injuries, evidence of plaintiff's daughter that she would not charge her mother anything for nursing, because the mother had nothing, but, if she was to do the nursing for a stranger, she would want \$200, "and that she did that as a daughter would do it for a mother," and did not expect her brother to pay for it, did not preclude the mother from recovering for the nursing, the value of which was fully proved.

6. Where requests to charge are fully covered by the charge of the court, a refusal thereof is not error.

7. Where plaintiff suffered a fracture of the neck of the femur by the premature starting of a street car as she was attempting to alight, a verdict of \$3,000 was not excessive.—(*Beringer vs. Dubuque St. Ry. Co.*, 91 N. W. Rep., 931.)

KANSAS.—Street Railways—Injuries to Persons on Track—Instructions.

1. In an action against an electric street railway company, by a party who was struck by a car and injured while attempting to drive over its tracks in a walk at a street crossing, the company introduced testimony that an approaching car could be seen for a distance of 277 ft. by a person standing within 15 ft. of the railway tracks. This contradicted the plaintiff, who testified that by reason of obstructions to her view she could see in the direction the car came 80 or 90 ft. only, when she was 15 ft. from the crossing. Held, that it was error to refuse an instruction tendered by the railway company to the effect that, if an approaching car was within the range of vision of the person injured, she was charge-



able with knowledge of its coming, notwithstanding the fact that she testified that she did not see it.—(Metropolitan St. Ry. Co. vs. Agnew et al., 70 Pacific Rep., 345.)

MAINE.—New Trial—Newly Discovered Evidence—Cumulative Evidence—Discretion of Court.

1. In granting a new trial upon motion based on newly discovered evidence the true doctrine is that the newly discovered testimony must be of such character, weight and value, considered in connection with the evidence already in the case, that it seems to the court probable that on a new trial, with the additional evidence, the result would be changed; or it must be made to appear to the court that injustice is likely to be done if the new trial is refused.

2. It is not sufficient that there may be a possibility or chance of a different result, or that a jury might be induced to give a different verdict. There must be a probability that the verdict would be different upon a new trial. But it is not necessary that the additional testimony should be such as to require a different verdict.

3. If it were true that such new evidence must be of such a character as to require a different verdict upon a new trial, as stated in *Linscott vs. Insurance Co.*, 34 Atl. 405, 88 Me. 497, 51 Am. St. Rep. 435, and *State vs. Stain*, 20 Atl. 72, Me. 472, then it would follow as a logical consequence that none but a different verdict would be allowed by the court to stand.

4. The rule stated in those two cases is too strict. It would deprive a party of the privilege of having his evidence passed upon by a jury, whose peculiar province it is to decide controverted issues of fact, even in cases where the court is of opinion that the new evidence would probably change the result, or that injustice would be likely to be done if a new trial was not granted.

5. It is not an absolute and unqualified rule that a new trial will not be granted under any circumstances upon newly discovered cumulative evidence.

6. When the newly discovered evidence is additional to some already in the case in support of the same proposition, the probability that such new evidence would change the result is generally very much lessened, so that much more evidence, or evidence of much more value, will generally be required when such evidence is cumulative; but if such newly discovered testimony, although merely cumulative, is of such character as to make it seem probable to the court that, notwithstanding the same question has already been passed upon by the jury, a different result would be reached upon another trial with the new evidence, then such new trial should be granted.

7. The provisions of the statute (Rev. St. c. 89, Sec. 4), applicable to petitions for review, that "newly discovered cumulative evidence is admissible and shall have the same effect as other newly discovered evidence," should have some effect upon the value of such testimony upon motions for a new trial; otherwise a party who had lost a verdict would have greater rights upon a petition for review after judgment than upon a motion for a new trial before.

8. While it is important to have general rules in regard to granting new trials upon this ground, which may be known to the profession, and by which the court will be governed so far as practicable, each case differs so materially from every other that the decision of the question as to whether or not a new trial should be granted in any particular case must necessarily depend to a very large extent, but, of course within the limits of such general rules, upon the sound discretion of the court, which will always be actuated by a desire, upon the one hand, to put an end to litigation when the parties have fairly had their day in court, and, upon the other hand, to prevent the likelihood of any injustice being done.

*Linscott vs. Insurance Co.*, 34 Atl. 405, 88 Me. 497, and *State vs. Stain*, 20 Atl. 72, 82 Me. 472, criticised.—(*Parsons vs. Lewiston, B. & B. St. Ry.*, 52 Atlantic Rep., 1006.)

MARYLAND.—Street Railways—Injury to Passenger—Negligence—Evidence—Instruction.

1. A prima facie case of negligence is made out by testimony of plaintiff that, being a passenger on defendant's street car, she indicated her desire to leave it, which was stopped to enable her to do so, and that while she was in the act of leaving, and before she could place herself safely on the ground, it started and threw her.

2. Plaintiff having testified on her direct examination that on her signal the car came to a full stop, and she stepped on the footboard, and as she was about to put her left foot to the ground, while having the other on the step, the car started, and she was thrown; and on cross-examination that she got on the footboard, and as she was putting her left foot to the ground the car started off; and on redirect examination that she had hold of the car, and it started and jerked her around and threw her on her left hip—she cannot be considered as affirming that when the car

started she was in a firm and safe position on the footboard, and as matter of simple volition and from motives of saving herself inconvenience she left such place of safety and stepped from the car while it was in motion, though on cross-examination, before testifying as above, she answered "Yes" to the questions, "You got down on the footboard?" "Then the car started?" "And then you tried to step down?" and to the question, "There was no reason why you did not step back?" answered, "It was not handy for me, I being crippled;" and to the question, "You preferred to step off?" answered, "Yes;" and to the question, "You thought it was going slow enough for you to step off?" answered, "It started off fast."

3. A requested instruction that if the jury find that plaintiff signaled for the car to be stopped, and after it had stopped stepped on the footboard, but "voluntarily and without necessity" stepped to the ground while the car was in motion, verdict should be for defendant, is objectionable as leaving the jury to treat the necessity that was to govern plaintiff's conduct under the circumstances as an absolute necessity; the evidence showing she was crippled in her left limb from rheumatism, that when the car started she was in the act of putting her left foot on the ground, and that in the effort to alight she was holding to the handle-bar of the car; she thus, by defendant's negligence, being put in a position of danger calculated to alarm and disconcert her and prevent exercise of clear judgment, and therefore being held only to ordinary care under the circumstances.—(*United Rys. & Electric Co. of Baltimore vs. Beidelman*, 52 Atlantic Rep., 913.)

NEW YORK.—Mandamus—Railroads—Operation of Trains—Complaints to Railroad Commissioners—Certiorari.

1. As the railroad law (Laws 1890, c. 565) places the responsibility of determining how many trains shall be run, and at what intervals of time, on the board of directors of a railroad company, mandamus will not lie in the first instance on the application of persons claiming to be aggrieved by failure of a railroad company to properly operate its trains to compel it to restore a continuous train service to a named station, which had been in part abandoned.

2. Where the board of directors of a railroad company have abused the discretion committed to them by the statute as to the manner of operating trains on their road under the railroad law (Laws 1890, c. 565, Sec. 161), complaint may be made to the board of railroad commissioners, which has express authority to determine, after hearing, whether the manner of operating the road is reasonable and expedient, so as to promote the security and convenience of the public.

3. The determination of the board of railroad commissioners as to whether the method of operating a railroad is reasonable, as provided by the railroad law (Laws 1890, c. 565, Sec. 161) is, by Sec. 162, enforceable in the courts by mandamus.

4. The Appellate Division, on review by certiorari of an application for mandamus to enforce the determination of the board of railroad commissioners as to the proper operation of a railroad company, has the power to examine the facts.—(*People ex rel Linton vs. Brooklyn Heights R. Co.*, 64 N. E. Rep., 788.)

NEW YORK.—Carriers—Duty to Protect Passengers—Evidence—Dismissal.

1. Plaintiff's evidence, if credible, established the facts that, while a passenger on defendant's railroad train, other passengers, without provocation, began to insult and revile him and his companion, who were talking in the German language. They took hold of the plaintiff's hat, and hustled him, and, on the conductor being asked to interfere, he said "he could do nothing; that if he asked them to stop they wouldn't do it." Afterward the conductor did ask them to "stop that fooling," at which they merely laughed, and he walked out of the car, when they resumed their boisterous conduct and insults. Just before a station was reached the other passengers threw plaintiff's hat on the floor, struck him, and when he rose to regain his hat threw him to the floor, and then walked over him out of the car to the station. Held, that it was error to dismiss plaintiff's case for damages at the close of such evidence.—(*Koch vs. Brooklyn Heights R. Co.*, 78 N. Y. Supp., 99.)

NEW YORK.—Failure to Introduce Evidence—Instructions—Personal Injury.

1. Where the evidence in an action for personal injuries shows that an alleged injury is not apparent from objective symptoms, but will be disclosed by an X-ray examination, and plaintiff introduces a physician who testifies that he made such examination, but fails to show the result thereof, the defendant is entitled to an instruction that the jury may assume that the testimony of the witness, if given, would have been adverse to plaintiff, even though the fact of such examination was called out by defendant, who could have examined the witness as to the result of the examination.—(*Kane vs. Rochester Ry. Co.*, 77 N. Y. Supp., 776.)

NEW YORK.—Carriages of Passengers—Breach of Contract—Misconduct of Servant.

1. A bill of particulars, furnished in connection with an oral complaint "for personal injuries" against a common carrier, set out that defendant's conductor refused to accept plaintiff's properly tendered fare, and without cause assaulted plaintiff, and threw him off the car, and that thereby plaintiff was injured. Held, that a bill of particulars being merely an amplification of the complaint, the cause of action was still founded on breach of contract by the misconduct of defendant's servant, though such misconduct may have resulted in an assault; and that hence jurisdiction of the municipal court is not prohibited by Greater New York Charter, Sec. 1364, subd. 2, providing that such court shall have jurisdiction of actions "to recover damages for a personal injury, \* \* \* excepting actions to recover damages for an assault," etc.—(Hines vs. Dry Dock, E. B. & B. R. Co., 78 N. Y. Supp., 170.)

NEW YORK.—Railroads—Injuries to Persons on Track—Negligence—Question for Jury.

1. The fact that defendant's car was run through a fog, at the rate of 18 miles an hour, when injuring plaintiff on the track, is sufficient to present, for determination by the jury, the question of defendant's negligence.—(Denton vs. Brooklyn Heights R. Co., 78 N. Y. Supp., 157.)

NEW YORK.—Pleading—Answer—Admissions—Special Plea—Effect of Admission.

1. Where a defendant makes a general denial, plaintiff cannot take advantage of any admission in a special plea as if it were made generally in the action.

2. In an action against a street railroad the complaint alleged an assault by defendant's conductor on plaintiff while a passenger. The answer was a general denial, and, as a special plea, that plaintiff refused to pay his fare, and, on his refusal to leave the car, the conductor gently laid his hands on the plaintiff and removed him from the car, doing him no unnecessary violence. Plaintiff did not prove any assault. Held, that there was no admission in the answer or which plaintiff could take advantage as showing an assault.—(De Waltoff vs. Third Ave. R. Co., 78 N. Y. Supp., 132.)

NEW YORK.—New Trial—Practice—Settlement of Order Denying Motion.

1. The court having granted defendant's motion for a new trial, made on the minutes on all the grounds stated in Code Civ. Proc., Sec. 999, and this having been reversed, and judgment directed to be entered on the verdict, defendant cannot thereafter have a settlement of an order denying his motion for a new trial on the grounds that the verdict was contrary to the evidence and the law—Grounds embraced in Sec. 999.—(Sidmonds vs. Brooklyn Heights R. Co., 78 N. Y. Supp., 129.)

OREGON.—Reference—When Allowed—Trover—Evidence—Agent—Collection of Money.

1. Under Hill's Ann. Laws Or., Sec. 222, subd. 1, providing that the court may upon the application of either party, or upon its own motion, direct a reference, "when a trial of an issue of fact shall require the examination of a long account on either side," either an action in tort or contract may be referred, so long as there is a long account involved.

2. Where the conclusion can be fairly drawn from facts disclosed by affidavit, or upon the face of the pleadings, that so many separate and distinct items will be litigated or examined that a jury cannot keep the evidence in mind in regard to each item, the case may be referred.

3. Where there is a conflict in the evidence, or there is reasonable ground for controversy, as to whether the issue involves the examination of such an account, and the court below has decided to refer the cause its conclusion will not ordinarily be disturbed on appeal.

4. Where an agent's contract of employment requires him to turn over to his principal the identical moneys collected for the principal, trover may be maintained by the principal against him for the conversion of moneys collected.

5. In trover by a corporation for moneys collected by an agent, it is not necessary to describe any particular money converted if the aggregate of the conversion be given.

6. Hill's Ann. Laws Or., Sec. 691, subd. 5, permits evidence of the contents of a writing where the original consists of numerous accounts which cannot be examined in court without great loss of time, and the evidence sought from them is only the general result of the whole. Held, that where the accounts to be examined to determine whether an agent had converted moneys were numerous, it was proper to allow an expert who had examined the books to testify as to the result of his investigations.

7. Where an expert testified as to the contents of plaintiff's books, that the books themselves were not offered is no ground for complaint on appeal; the record indicating that they were in court, and the failure to offer them not having been made a ground of objection to the expert's testimony.

8. On appeal the court can only examine the testimony for the

purpose of ascertaining whether there was any competent evidence tending to support the conclusions of the trial judge.

9. In trover for the conversion of moneys collected by defendant as plaintiff's agent, the evidence showed that the books of account were kept under the direction of the defendant; that they indicated that certain moneys due the plaintiff were collected from the State and from the county, and not accounted for by him; and that two false entries had been made therein by the defendant's direction, crediting one account with large sums and charging the same to stores, when in fact no stores had been purchased. The defendant gave no evidence on the trial whatever, and did not undertake to explain any of these circumstances, or account for the false entries in the books. Held, that the evidence sustained a verdict for plaintiff.

RHODE ISLAND.—Municipal Corporations—Proceedings of Council—Time of Meetings—Illegal Ordinance.

1. Gen. Laws, c. 40, Sec. 3, provides that, when a quorum of the town council is not present, the clerk shall continue all business to the next regular meeting. An ordinance returned without the approval of the mayor was laid over to the next meeting, to be held at 9 a. m. on a succeeding day. The president was present at the hour appointed, and at 9.35 declared the meeting off for lack of a quorum. At 10 o'clock all the members except the president met, and passed the ordinance over the veto. Held, that the passage was illegal, as, no quorum having appeared within the hour named, the meeting expired by its limitation of adjournment.

2. Under a city charter providing that the City Council shall meet for organization on the first Monday of January, at 10 a. m., and that officers shall hold their respective offices until their successors shall be elected and qualified, the old council had no authority to hold a meeting after the time set for the organization of the new Council, except to act in an emergency in case the new members did not qualify.—(Fitzgerald vs. Pawtucket St. Ry., 52 Atlantic Rep., 887.)

RHODE ISLAND.—Street Railway Crossing—Negligence—Track—Duty to Look.

1. Where a man driving a very gentle horse, hitched to a light wagon, in a locality with which he was familiar, on a street which crossed an electric railway, drove out of said cross street and up to the track at a slow trot, and without change of rate of speed until the instant the horse was struck by a rapidly approaching car, which the driver had not seen, though he could have seen it in ample time to have stopped had he looked, he was guilty of negligence, and could not recover for the injury so sustained even though the motorman was also negligent in failing to ring the bell; the rule requiring a man to look before crossing a steam railway being equally applicable to an electric railway.—(Berman vs. Union R. Co., 5 Atlantic Rep., 1090.)

TEXAS.—Street Railroads—Ejecting Passenger—Instructions—Harmless Error—Acts of Conductor—Ratification—Exemplary Damages—Evidence.

1. Where it appears that a jury, by their verdict, did not allow double damages for humiliation and mental suffering in an action for injuries to a passenger, that an instruction was erroneous in that it authorized a recovery for both humiliation and mental suffering, while humiliation was a form of mental suffering, was not ground for reversal.

2. Where, in an action for malicious assault and ejecting of a passenger from a street car, it was shown that the conductor was prosecuted before a justice, and that the railroad defended him by its attorneys, and that its general manager was present at the trial, paid the conductor's fine, and that he was retained in the company's employ after the assault, it justified a finding that the company ratified the conductor's acts.

3. Where, in an action for wrongful assault in ejecting a passenger from a street car for non-payment of fare, it appeared the conductor was notified by plaintiff and his companion that he had paid his fare, but the conductor, notwithstanding this fact, made an unnecessary assault on plaintiff, striking him several times in the face, and causing blood to flow from his nose, and bruising and scratching his face, and the defendant ratified the acts of the conductor, the evidence justified the submission of plaintiff's right to recover exemplary damages to the jury.—(Denison & S. Ry. Co. vs. Randell, 69 S. W. Rep., 1013.)

TEXAS.—Courts—Jurisdiction of Supreme Court—Courts of Civil Appeals—Conflicting Decisions.

1. In an action against a city and street railway company for a death caused by a rail in the railroad track being allowed to remain above the level of the street, in violation of an ordinance authorizing the street commissioner to fix the grade of the streets and requiring street railway companies to comply strictly with such grade and to keep the top of the rails flush with the surface of the streets, a court of civil appeals decided that an instruction that, if defendants permitted the surface of the street to become

lower than the rail, so as to interfere with the safe crossing of the street with vehicles, and if deceased was thrown from his wagon and was killed while in the exercise of reasonable care, plaintiffs could recover, was erroneous, as taking from the jury the question of defendants' negligence. Held, that such decision is not in such conflict with the decisions of the Supreme Court and the courts of civil appeals that the violation by a railway company of statutes and ordinances is negligence per se, as to give the Supreme Court jurisdiction to review the case, the decision merely construing the ordinance so as to require the street railway company to exercise ordinary care only to keep the streets in the condition prescribed.

2. A decision of the court of civil appeals which overrules a decision of the old court of appeals does not give the Supreme Court jurisdiction of the case, within Rev. St. art. 941, authorizing the Supreme Court to review cases in which a court of civil appeals overrules its own decisions or the decisions of another court of civil appeals.—(Gossett et al. vs. Citizens' Ry. Co., 69 S. W. Rep., 976.)

NEW YORK.—Street Railways—Accident at Crossing—Looking and Listening—Evidence—Sufficiency—Judicial Notice—Setting of Sun.

1. In an action against a street car company for damages resulting from collision of defendant's car with plaintiff's cab at a street crossing, evidence considered, and held insufficient to support a finding that plaintiff was free from contributory negligence.

2. The courts will take judicial notice of the rising or setting of the sun on any day, and may use the almanac where such question is material for the purpose of refreshing the memory of the court and jury.—(Montenes vs. Metropolitan St. Ry. Co., 78 N. Y. Supp., 1059.)

NEW YORK.—Carriers—Injury to Passenger—Negligence—Sudden Start—Question for Jury—Evidence—Admissions—Acquiescence.

1. Where two witnesses testified that a street car came to a stop before plaintiff attempted to alight, and suddenly started with a jerk, throwing plaintiff to the ground, while defendant's witness testified that plaintiff attempted to alight while the car was in motion, the question of defendant's negligence and plaintiff's contributory negligence was for the jury.

2. Where a physician testified that, at the time of the statement made by a third person in plaintiff's presence, she was conscious, but was suffering from shock occasioned by an injury, and that he could not recall, from any indication by response or physical action, that plaintiff heard such statement, it was not admissible as an admission, on the ground that it was made in plaintiff's presence and hearing and was not objected to by her.—(Schilling vs. Union Ry. Co. of New York City, 78 N. Y. Supp., 1015.)

NEW YORK.—Carriers—Street Railways—Negligence—Evidence—Sufficiency—Resulting Injury—Evidence of Character—Hypothetical Question—Objections—Exceptions.

1. In an action for personal injuries against a street railway plaintiff testified that, after the car on which he was a passenger had been stopped in response to his signal to the conductor, he stepped down upon the running board, and from that position was thrown to the ground by a sudden starting of the car. Another passenger corroborated his statement, except as to the car starting up again before he was injured, but she did not explain how he could have been injured with the car standing still. A third passenger testified that plaintiff was injured by stepping from the car while it was in motion. Neither the conductor nor motorman was called, nor was their absence explained. Held, that a verdict in favor of plaintiff was not against the preponderance of the evidence.

2. In an action for injuries received in a street railway accident plaintiff testified that a hernia was produced thereby, and the physician who attended him (an unwilling witness) testified that, on his first examination of plaintiff's groin, a day or so after the accident, he found a hernia, but whether of recent or long standing he did not know. Held, that the hernia was shown to have resulted from the accident, so as to render competent testimony as to the nature of the hernia as ascertained by an examination two and a half years after the accident.

3. Where the plaintiff in an action for injuries received in a street car accident included in one of several hypothetical questions certain injuries which had been eliminated from the case, and no objection was interposed on the ground that the question assumed unproved facts, an exception to the question did not present error in that regard.—(Muller vs. Metropolitan St. Ry. Co., 78 N. Y. Supp., 1069.)

NEW YORK.—Street Railways—Injury to Pedestrians—Negligence of Motorman—Evidence—Contributory Negligence.

1. Plaintiff attempted to cross a double street car track, and waited for a southbound car to pass him, when he started to cross

in front of a northbound car, about 100 ft. away, without looking for a second southbound car, which was following the first at a distance of about 75 ft. Plaintiff was just stepping from the southbound track when he discovered that the northbound car was approaching at a greater speed than he had anticipated, when he attempted to retrace his steps, and he was struck by the following southbound car. The motorman stopped the car within five or six feet. Held, that since the motorman was under no obligation to stop until danger appeared, and he had a right to assume that plaintiff would continue across the northbound track, he was not guilty of negligence.

2. Plaintiff was guilty of contributory negligence, as a matter of law, in attempting to cross without paying any attention to the following southbound car.—(Jackson vs. Union Ry. Co. of New York City, 78 N. Y. Supp., 1096.)

NEW YORK.—Street Railways—Personal Injuries—Meeting of Cars—Negligence—Suit by Administratrix—Damages for Death of Intestate—Sufficiency.

1. In an action for the death of plaintiff's intestate, the evidence showed that deceased, on alighting from a westbound trolley car at a place much frequented by pedestrians, passed around the rear of the car and attempted to cross the opposite track, and in so doing was struck and killed by an eastbound car running at full speed and giving no warning of its approach. Held, that his death was caused by the negligence of the motorman in charge of the eastbound car.

2. A verdict of \$10,000 in favor of an administratrix is full compensation for the death of the intestate, he being thirty-five years of age, earning \$12 a week as a milk driver, and leaving, besides his widow, two daughters aged nine and twelve years, respectively.—(Stilling vs. Union Ry. Co. of New York, 78 N. Y. Supp., 624.)

NEW YORK.—Street Railways—Negligence—Injury at Crossing—Evidence—Instructions.

1. In an action against a street railway company for personal injuries caused by being struck by defendant's car at a crossing, plaintiff testified that he was in the middle of the track when struck. Two of his witnesses testified that he was between the first rail and the middle of the track, and another witness that the front of the car was about  $7\frac{1}{2}$  ft. from the crossing when plaintiff was in the gutter, and that plaintiff was just stepping on the track when he was struck. The court had charged that if the testimony of plaintiff's witnesses was true, and the car was going so fast that the motorman could not control it until plaintiff was struck, plaintiff was entitled to recover. Held that, as the jury might have found from the testimony that plaintiff stepped on the track so closely in front of the car that it would have been impossible for the motorman to have stopped in time, the refusal of a charge that, if plaintiff was struck as soon as he stepped on the track, his negligence contributed to his injury, was error.—(Muessman vs. Metropolitan St. Ry. Co., 78 N. Y. Supp., 571.)

NEW YORK.—Street Railways—Passenger—Injuries—Negligence—Evidence—Question for Jury—Contributory Negligence.

1. In an action against a street railway for injuries to a passenger, evidence considered, and held, that the question of defendant's negligence was for the jury.

2. In an action against a street railway for injuries to a passenger, evidence considered, and held, that the question of plaintiff's contributory negligence was for the jury.—(Berry vs. Utica Belt Line St. R. Co., 78 N. Y. Supp., 542.)

NEW YORK.—Street Railways—Negligence—Evidence—Trial—Verdict—Setting Aside Verdict.

1. In action against a street railway company for death of a child run over by a car, evidence considered, and held, that question of defendant's negligence was for the jury.

2. A verdict may be set aside, and a new trial granted, although the case is one that was necessarily submitted on the facts to the jury.—(Larkin vs. United Traction Co., 78 N. Y. Supp., 538.)

NEW YORK.—Action for Personal Injuries—Examination of Plaintiff Before Trial.

1. Code Civil Procedure, section 873, provides that in action for personal injuries the court may, if defendant apply therefor, direct that plaintiff submit to a physical examination by a physician appointed by the court; that, where defendant shall present to the court satisfactory evidence that he is ignorant of the nature of the injuries, the court shall order that such examination be made, etc. On the first trial of an action for personal injuries, an examination of plaintiff was made, with her consent, by a physician of defendant's own nomination, who was permitted to testify without objection. Held that, on a subsequent trial of the same action, defendant was not entitled to a re-examination of plaintiff by a physician appointed by the court.—(Whitaker vs. Staten Island Midland R. Co., 78 N. Y. Supp., 410.)

## FINANCIAL INTELLIGENCE

### The Money Market

WALL STREET, March 18, 1903.

Some definite improvement has taken place in the money situation during the week. While the demands throughout the interior of the country continue active and do not yet admit of any considerable flow of currency this way, the high local money rates are preventing further shipments from this to other cities. Last Saturday the New York banks reported a reduction in cash holdings of \$4,800,000, all of which was taken out by the Treasury. During the first few days of the Clearing-House week, however, the drain from this quarter has abruptly ceased, and, owing to the large disbursements now being made by the government for pensions and appropriations, the chances are good for the banks to at least hold their own for a time in the Washington exchanges. Meanwhile contraction of loans is likely to go forward pretty steadily. Last Saturday's \$15,000,000 decrease was, of course, unusual, and resulted largely from the inpour of foreign capital to take advantage of the high premiums offered locally for the use of funds. The sharp recovery of the past few days in sterling exchange seems to indicate that this foreign lending is over, at least for the time being. But with syndicate borrowers prudently holding aloof from the market, and speculation in stocks idle, the tendency is still rather toward contraction than expansion in our city bank credits. The improved position is reflected in a lowering of the ruling rate for time advances from the 6 per cent of a week ago, to 5½ per cent. Call money continues in rather scant supply on the Stock Exchange, and as high as 7 per cent was paid on Monday, when large sums had been withdrawn temporarily from the market to pay the \$20,000,000 Standard Oil dividends, and to meet one or two other similar requirements. But call loans are likely to be more easily obtainable from now on. In fact the money market movement promises to follow the usual course of the season with a gradual gain in bank reserves becoming more rapid and reflecting itself in an easing of money rates during April and May.

### The Stock Market

The general stock market has been irregular and feverish during the week, with rapid and violent changes in both directions. A strong bear party is undoubtedly at work, and Wall Street opinion is practically unanimous in attributing its leadership and inspiration to the interest which is directing the fight on behalf of the minority in the Southern Pacific Company against the management of the Union Pacific. That this contingent is heavily committed to the short side, partly as a hedge against its huge commitments in Southern Pacific stock, and partly in an effort to compel the large financial interests to favor their demands against the Union Pacific officials, is a favorite theory of the current speculation. Be this as it may, the contest in the affairs of this company seems to be the main disturbing factor in the present market situation. With the decline in bank reserves arrested, and money gradually tending easier, the necessity for forcing liquidation is obviously removed. Superficially viewed, stocks are strongly held and are not coming out in any quantity on the declines. Prices, moreover, are at a comparatively low level, considering that outside commercial conditions have not changed for the worse during the past twelve months. Nevertheless the constant activity of a powerful speculative faction on the bear side causes an atmosphere of uncertainty and uneasiness, which pervades all speculative circles of Wall Street. Unless these attacks are opposed by more aggressive action in support of prices, it is hard to see how business is going to improve or how confidence is to be restored.

The local traction stocks have followed the general movement very closely during the week. Manhattan selling with the 1¼ and the extra 1 per cent dividend off its price, has been rather well bought, and Brooklyn Rapid Transit has also received a fair measure of support. Metropolitan has been the weakest of the group, reaching the lowest figures so far on the present movement. The charges against the officials of the company and against the truth of its financial reports are mainly responsible for this weakness. Pending the investigation now in progress before the District-Attorney, it is unwise to venture any comment on the subject. But it can be stated that the overwhelming majority in Wall Street is on the side of the Metropolitan company, and places entire credence in the denials which the president and others connected with it have made in regard to the recent sensational accusations.

### Philadelphia

The Philadelphia street railway stocks have shown very good resistance considering the disturbance in their local market from the heavy break in Consolidated Lake Superior and other speculative issues. Business has been very light, and there is absolutely no news bearing upon the individual traction properties. But prices have fully held their own at the prevailing figures of the previous week. Union Traction has been particularly steady, rallying from 46½ to 47, and holding the higher figure firmly. Philadelphia Traction also recovered a half point to 97½. American Railways seems to be taken readily whenever offered down to 50, and Rapid Transit continues to receive support around 13¼. A hundred shares of Indianapolis Street Railway sold at 83½, and sales were reported in Consolidated Traction of New Jersey at 64¼, and in United Traction of Pittsburg preferred from 50 to 51.

### Chicago

The week in Chicago has been stupidly dull, so far as the traction properties are concerned. Little news or gossip of any consequence has developed. In the stock market prices have pretty generally been disposed to continue their recent decline, and in some instances the lowest figures of the season have been reached. Lake Street Elevated hangs at its low point, 5½. Metropolitan common dropped from 33½ to 33, and Metropolitan preferred was conspicuously weak, selling down from 82 to 80¾, later rallying to 81½. South Side was also off a point to 108½. The surface line shares held up no better. Union Traction common fell from 10 to 9½, the preferred sold at 42, while City Railway sank as low as 210, later rallying to 212. Nothing more is heard nowadays about the "consolidation deal." It is the general impression that such an enterprise will make no further progress until money market conditions are more propitious.

### Other Traction Securities

Boston Elevated, under further liquidation, developed extreme weakness, reaching 144¾, or 6 points lower than two weeks ago. This is a drop of nearly 30 points since last summer. The tendency to sell a high-priced security in a tight money market is the only reason assignable for the break. Massachusetts Electric common has been rather better supported, declining only fractionally to 35, while all the preferred offering has been readily absorbed around 92. West End issues have held well at 97 for the common, and 115½ for the preferred. In Baltimore the week's trading has been light, but with no further evidence of selling pressure. United Railways stock at 13, the incomes at 67¼ to 67½ and the general 4s at 93¾, represent substantially the same level of prices as a week ago. Other sales reported are Baltimore Traction 5s at 117, City & Suburban (Washington) 5s at 97¾, Anacostia & Potomac 5s at 100, and Charleston Electric Railway 5s at 106½. Another sharp break in North American stock has been one of the features on the New York Stock Exchange. The selling has come from scattered sources, and the movement has been significant, only as manifesting the absence of support in the stock. Sales of traction issue on the local curb for the week, comprise American Light and Traction common at 56 to 57½, the preferred at 98¼, Interborough Rapid Transit (70 per cent paid in) at 109, St. Louis Transit at 28¾, Brooklyn City Railroad at 245½, New Orleans common at 13½ down to 12¾, San Francisco 4s at 78½, and Brooklyn Rapid Transit 4s at 83 to 84. Bond sales were numerous on the Cincinnati Change last week. Indianapolis Street Railway 4s had the call, \$126,000 worth selling at 87 to 88½. Columbus, Delaware & Marion 5s continue stationary at 101, \$22,000 worth selling at this figure. Northern Ohio Traction & Light 4s sold to the extent of \$47,000 worth, all at 63¼. Cincinnati, Dayton and Toledo 5s sold to the extent of \$17,000 worth at 87½ to 88¾. In stocks, Cincinnati Street Railway was the feature, 1087 shares selling at from 141 to 142. Cincinnati, Dayton and Toledo sold at 35½ to 37 for 367 shares. Cincinnati, Newport & Covington sold 38½ for 650 shares. Central Market Street preferred (Columbus) sold to the extent of 215 shares, all at 97. Traction were quiet in Cleveland, 1167 shares selling. Lake Shore Electric common dropped to 11½, and then advanced to 12½, sales being 230 shares. Syracuse Rapid Transit was weaker, probably due to the fact that negotiations recently under way for a consolidation of the Syracuse traction interests have come to naught. A small lot sold at 29½, a decline from 30¼. Aurora, Elgin & Chicago sold down to 28¾ on small lot. Northern Ohio Traction & Light was again the most active stock, 622 shares selling at from 25¾ to 26½. Western Ohio re-

ceipts brought 26¼ and 26½ for 100 shares. Cincinnati Dayton & Toledo sold at 36 for small lot. These issues are still unaffected by negotiations looking to their merger. Western Ohio 5s sold to the extent of \$29,000 at 83½; \$24,500 worth of Northern Ohio Traction & Light 4s sold at 62¾ and 63. Monday Lake Shore Electric was weaker, the common selling at 11¼, and the preferred at 45. A block of Cleveland City Railway sold at 102, and 250 shares of Northern Ohio Traction & Light went at 26.

**Iron and Steel**

The Iron Age, submitting its regular monthly statistics, shows that pig-iron production during February had a further rise, and is now 348,000 tons per week. The same authority estimates that stocks of iron on hand increased during the month 38,000 tons, largely, however, because the deficiency of cars delayed shipments.

**Securities Quotations**

The following table shows the present bid quotations for the leading traction stocks, and the active bonds, as compared with last week:

	Closing Bid	
	March 10	March 17
American Railways Company.....	50	49½
Aurora, Elgin & Chicago.....	28½	a29
Boston Elevated.....	—	145
Brooklyn R. T.....	637½	645½
Chicago City.....	*210	210
Chicago Union Tr. (common).....	10	9½
Chicago Union Tr. (preferred).....	40	42
Cleveland Electric.....	78	83
Columbus (common).....	—	74
Columbus (preferred).....	—	104
Consolidated Traction of N. J.....	64	64
Consolidated Traction of N. J. 5s.....	108	108
Detroit United.....	84¼	83¾
Electric People's Traction (Philadelphia) 4s.....	97¾	98
Elgin, Aurora & Southern.....	52¼	52½
Lake Shore Electric.....	11¼	a11½
Lake Street Elevated.....	5½	5¼
Manhattan Railway.....	141½	*140¼
Massachusetts Electric Cos. (common).....	35¾	35
Massachusetts Electric Cos. (preferred).....	92	91
Metropolitan Elevated, Chicago (common).....	33	33½
Metropolitan Elevated, Chicago (preferred).....	82½	81
Metropolitan Street.....	132¾	133½
New Orleans Railways (common).....	13	12¾
New Orleans Railways (preferred).....	a42	a42
North American.....	104½	99½
Northern Ohio Traction & Light.....	25¾	a26
Northwestern Elevated, Chicago (common).....	29	—
Philadelphia Rapid Transit.....	14	13
Philadelphia Traction.....	97	*97½
St. Louis Transit (common).....	28	27½
South Side Elevated (Chicago).....	108¾	108
Syracuse Rapid Transit.....	a25	—
Syracuse Rapid Transit (preferred).....	a79¼	a80
Third Avenue.....	124	122
Toledo Railway & Light.....	a34¼	30
Twin City, Minneapolis (common).....	—	114¼
United Railways, St. Louis (preferred).....	—	—
United Railways, St. Louis, 4s.....	84½	84½
Union Traction (Philadelphia).....	46½	46¾

a Asked. \* Ex-Div.

Although the Lake Shore Electric Railway has been nominally refinanced, there is still a possibility that it may be sold under foreclosure. The scheme, under which Cleveland bankers agreed to take a large block of bonds, provides that the present preferred stockholders subscribe to a new issue of \$1,500,000 preferred stock at \$60 per share. It is claimed that the majority of the larger stockholders have subscribed for their pro-rata share of the new stock, but that many of the smaller holders of preferred are holding off for the reason that the present preferred, which will be on an equal basis with the new stock, is selling in the open market for considerably less than \$60. A large stockholder, who is friendly to the refinancing plan, has issued an open letter in which he states that the Everett-Moore syndicate has advanced the company at least \$350,000 in order that the property might be protected in its entirety, and that being heavy creditors, the syndicate, if it desired, could foreclose the property and squeeze out the smaller stockholders. Altogether, the Everett-Moore syndicate is said to hold claims against the road amounting to \$1,500,000, and were a sale at the hands of the receiver decided upon, the syndicate would undoubtedly buy the road and refinance it. It is believed this statement is likely to induce the small stockholders to fall into line, since they would probably lose everything should the mortgages be foreclosed.

**INCREASING SERVICE ON THE AURORA, ELGIN & CHICAGO RAILWAY**

The Chicago, Elgin & Aurora Railway Company, at present operating between Chicago and Aurora, has placed in service ten of the lot of twenty-five new cars received recently from the John Stephenson Company, of Elizabethport. It is proposed to shorten the running time between Aurora and the Chicago terminus at Fifty-second Avenue from one hour and fifteen minutes to one hour. Trains will consist of three cars each, instead of one, as at present, and will run at intervals of fifteen minutes instead of half-hourly. A feature that is expected to divert traffic from the steam railroads is that single fares will be sold on the basis of rates charged by the steam roads for monthly commutation tickets. The Elgin branch of the road will be put in operation the latter part of April.

**TWO PROPOSITIONS TO LEASE NEW JERSEY COMPANIES**

The report that deal is on for the merging of the North Jersey Street Railway Company, the Jersey City, Hoboken & Paterson Railway Company, the Orange & Passaic Valley Railway Company and the Elizabeth, Plainfield & Central Jersey Railway Company was confirmed on Thursday, March 12, when the directors of the companies met to consider a proposition made by Thomas A. Nevins, who is a director of the Elizabeth, Plainfield & Central Jersey Company. The plan of Mr. Nevins is to organize under the laws of New Jersey a company to be called the United New Jersey Railway Company, which shall lease for 999 years all the properties mentioned, guaranteeing to them the payment of fixed rentals semi-annually on Jan. 1 and July 1 of each year. These rentals are to be paid before July 1, 1903, and will carry the following dividends thereafter on the present issues of stock of each road:

North Jersey Bonds, \$8,500,000; Stock, \$15,000,000—First year, nothing; second, third and fourth, one-half of 1 per cent; fifth year, 1-1-3 per cent; sixth, 1-2-3 per cent; seventh, 2 per cent; eighth, 2½ per cent; ninth, 3 per cent; tenth, 3½ per cent; eleventh, 4 per cent.

Jersey City, Hoboken & Paterson, Bonds, \$11,000,000, Stock, \$20,000,000—First year, nothing; second, one-half of 1 per cent; third and fourth, 1 per cent; fifth, 1-1-3 per cent; sixth, 1-2-3 per cent; seventh, 2 per cent; eighth, 2-1-3 per cent; ninth and tenth, 2-2-3 per cent; eleventh, 3 per cent.

Elizabeth, Plainfield & Central Jersey, Bonds, \$1,400; Stock, \$3,000,000—First year, nothing; second, one-third of 1 per cent; third, two-thirds of 1 per cent; fourth, 1 per cent; fifth, 1-1-3 per cent; sixth, 1-2-3 per cent; seventh, 2 per cent; eighth, 2½ per cent; ninth, 3 per cent; tenth, 3½ per cent; eleventh, 4 per cent.

Orange & Passaic Valley, Bonds, \$500,000; Stock, \$1,000,000—First year, nothing; second, one-third of 1 per cent; third, two-thirds of 1 per cent; fourth, 1 per cent; fifth, 1-1-3 per cent; sixth, 1-2-3 per cent; seventh, 2 per cent; eighth, 2-1-3 per cent; ninth and tenth, 2-2-3 per cent; eleventh, 3 per cent.

According to Mr. Nevins' proposition, the United New Jersey Railway Company is to pay all operating and other charges of the leased companies, including all repairs necessary to keep the properties in a high state of efficiency.

The company is also to place in the hands of a trustee \$4,000,000 of its cash capital of \$4,750,000 as a guarantee for the performance of the leases. The proposition further sets forth that the properties of the leased lines shall be put in a high state of efficiency, this to include all necessary improvements, replacement and repairs. All the indebtedness of the several companies shall be funded by the issue of bonds under their present mortgages as far as possible at market prices, and the balance above the proceeds of such bonds by a new form of obligation.

This is not to carry more than 5 per cent interest. The New Jersey Railway Company is to have the right to invest the guarantee fund of \$4,000,000 in the bonds of the leased companies at current market rates in the new obligations of the company at par and in other approved interest-bearing securities, provided that not more than \$3,000,000 of the fund shall be invested at any one time in the securities of the leased companies.

The New Jersey Railway Company will have the right to sell securities for not more than the price paid, and the securities or proceeds are to be placed in the hands of the trustees. The company will have the right to invest the balance of its money, \$750,000, in the purchase or construction of additional railroad lines, or may loan some to the leased companies on their temporary obligations.

The leased companies will make repairs, for the payment of which they shall issue bonds authorized under the present mortgages and shall issue a new form of securities at par to pay the balance of such costs, all of which the United Company shall be authorized to purchase and sell, the leased companies agreeing to refund their bonds and other obligations on the best possible terms.

The total stocks and bonds represented in the leased lines is \$21,400,000 in bonds and \$39,000,000 of stock. The North Jersey pays interest on the bonds of the Orange, Newark, Essex Passenger, Consolidated Traction and Rapid Transit companies, as well as interest on its own bonds.

Since the announcement of the proposition made by Mr. Nevins the statement has been made that an alternative proposition to lease the companies has been made by a syndicate composed of Senator John F. Dryden, P. A. B. Widener, A. J. Cassatt, John D. Crimmins and others. Of this proposition no definite announcement has been made. It is understood, however, that the Fidelity Trust Company will finance this deal, which is said to include the investment of \$5,000,000 for the purpose of improving the properties.

### THE ANNUAL MEETING OF THE ST. LOUIS TRANSIT COMPANY

The annual meeting of the St. Louis Transit Company was held Tuesday, March 10. The retiring board of directors was re-elected with one exception, James L. Blair taking the place of Charles D. McLure on the board of directors of both the St. Louis Transit and United Railways Companies. The directors elected include A. H. Bauer, Murray Carleton, Alanson D. Brown, Patrick Calhoun, James Campbell, Eugene Delano, George L. Edwards, Finis E. Marshall, H. S. Priest and Corwin H. Spencer. The directors met later in the day and re-elected officers.

In the annual report submitted by President Murray Carleton stress is laid on the fact that much new equipment has been secured during the year just closed, besides the many new extensions, betterments, etc. The completion of the "north" power house at Broadway and Salisbury Street is said to have effected a large decrease in operating expenses.

The earnings show that the deficit in the year just closed was \$268,083, as against \$525,630 in the fiscal year 1901, or a gain in net earnings of \$257,547.

The heavy increase in population, which President Carleton dwells upon, is given as the reason for much of the expenditures of the corporation for new cars, etc., and considerable further acquisition to the rolling stock of the company is contemplated.

In his estimate on the World's Fair traffic, President Carleton is especially sanguine, and while not basing his estimate on anything especially tangible, figures that receipts per day should average near \$60,000.

The report of the auditor, Frank R. Henry, develops the fact that while there has been a fair, though proportionate gain in the amount of operating charges, earnings have more than kept pace, and the receipts during the first quarter of 1903 are sufficiently larger than those during the corresponding period a year ago to justify the assurance that the current year will see the wiping out of the deficit on the preferred shares.

The amount of common stock outstanding at the present time is \$17,264,300, while United Railways preferred to the amount of \$16,755,400 has been issued, and \$28,292,000 United Railways 4s, besides \$5,776,000 collateral trust gold notes, out of an entire authorized issue of \$6,000,000.

The fact developed at the meeting that the proportion of ownership of Brown Brothers & Company, of New York, the firm which syndicated the St. Louis lines, was somewhat smaller than that a year ago. On the other hand, the holdings of local capitalists interested in the transit lines, according to the amount of stock voted at the meeting, were shown to have increased materially.

The report mentions in detail the improvements made during the year, and calls attention to the plans that are making for handling the extraordinary traffic that will result from the Louisiana Purchase Exposition.

The report of the company as made public shows:

	1902	1901
Earnings .....	\$6,452,219	\$5,783,912
Expenses and taxes.....	3,967,721	3,692,400
Income .....	\$2,484,498	\$2,091,572
Interest and rental .....	2,752,581	2,617,142
Deficit in operation .....	\$268,083	\$525,630
VOLUME OF BUSINESS		
Revenue passengers .....	130,830,722	117,546,811
Transfers and passes .....	54,247,218	46,449,131
Total passengers .....	185,077,940	163,995,942
Mileage .....	31,074,581	29,340,361

The percentage of increase in the number of revenue passengers

carried was 11.30. The transfer facilities afforded by the company were used more exclusively than ever before. In 1901 the percentage of passengers using transfers was 36.76; in 1902 it was 38.68.

From the above it will be seen that the percentage of increase is as follows: Earnings, 11.55; operating expenses and taxes, 7.45; reserve passengers, 11.30; mileage, 5.91.

### INQUIRY ON METROPOLITAN FINANCES

For the last three weeks statements of a bear character have been current in Wall Street in regard to Metropolitan Street Railway Company. They took more or less definite shape and varied all the way between the rumor that one gentleman who is supposed to be paramount in Metropolitan affairs had disposed largely of his stock, to the statement that there had been a defalcation by which the company had suffered to the extent of several millions. The first rumor was promptly denied by William C. Whitney, and the latter by Mr. Vreeland. But definite form was given last week to these vague statements when one of the daily papers in New York published a long account of an alleged investigation made by John C. Hertle, an ex-commissioner of accounts, and Max. Teichmann, a Baltimore accountant, into the Metropolitan's finances. According to Mr. Hertle's findings, there was a deficit on June 30, 1901, of \$18,000,000, instead of a surplus, as claimed, of \$5,000,000. This finding was made in spite of the fact that in another portion of the report Mr. Hertle says, "in order to arrive at a complete and correct statement of the affairs of the Metropolitan Street Railway Company it will be absolutely necessary to make an exhaustive examination of the company's books and records." This, the writer says, he did not do. Mr. Teichmann's conclusions were practically to the same effect as those of Mr. Hertle. The findings of both accountants were submitted to District Attorney Jerome, who is investigating the company's condition at the request of W. N. Amory, who was at one time connected with the Third Avenue Railroad Company.

The charges have been denied in toto by Mr. Vreeland, who has declared them false from beginning to end. Mr. Vreeland further stated that about two weeks ago his company was notified by the District Attorney that charges had been filed against it, but that no action would be taken on the charges until the company had been given the fullest opportunity to explain them. The services of Stephen Little, the well-known accountant, were immediately secured, and Mr. Little was asked to familiarize himself with the accounts of the Metropolitan Street Railway Company, and to make a careful examination of the charges filed with the District Attorney. This was done, and as a result of this investigation Mr. Little made the following statement:

Some days ago I was asked by President Vreeland to consider a number of so-called charges which had been filed with the District Attorney by one W. N. Amory. A few days later I received a voluminous compilation of figures furnished by the District Attorney, which was said to embody those charges. I thereupon devoted several days to a careful examination of this compilation. I found that the charges were based upon the reports of the Metropolitan Street Railway Company and its allied companies to the State Railroad Commissioners and upon one statement made by the Metropolitan Company to the Stock Exchange upon an application to list an issue of its bonds. It was claimed by the framer of the charges that these documents were inconsistent and revealed discrepancies. My investigations made it absolutely clear that every one of the charges was preposterous and false. These accountants distorted and perverted the figures contained in these reports for their own purposes. There were in fact no discrepancies and no inconsistencies when the figures were rightly considered in their proper relation to one another. Never but once in my entire professional experience have I been called upon to deal with statements so ridiculous upon their face, so preposterous from beginning to end and so plainly intended for an ulterior purpose.

The company has further offered to give the District Attorney full opportunity to examine all of its books and records and to facilitate in every way all investigation into the alleged discrepancy.

It is also stated that E. A. Philbin, ex-District Attorney, is making an independent investigation of the company's finances in behalf of a stockholder.

One result of the attack on the Metropolitan Street Railway Company during the past week is that the stock has gone up three or four points from the lowest price of the week, and closed on March 18 at 134¾.

The Manila Railways & Light Company has just been incorporated in New Jersey, with a capital stock of \$1,000,000, to construct the electric railway at Manila, for which a franchise was recently granted to Charles M. Swift, of Detroit, J. G. White & Co., of New York, and their associates.

## THE ISSUE AT WATERBURY

The most important move that has been made toward breaking the strike of the employees of the Connecticut Railway & Lighting Company at Waterbury, Conn., was taken on March 14, when papers were issued in a temporary injunction by Judge Elmer, of the Supreme Court, on application of the company, restraining the Street Railway Union and most, if not all, of the unions in the city from acts calculated to interfere with the company's business or its employees.

The injunction is sweeping in its nature, enjoins the strikers and their sympathizers from boycotting the plaintiff or its employees, or any other corporation or persons, from in any way impeding the business of the railroad company, and from acts of intimidation and violence, under a penalty of \$10,000.

In the complaint of the company, attached to the writ, an attachment to the amount of \$25,000 is ordered placed on the property of the defendants. The list of the defendants begins with the name of William J. Barrett, president of Union No. 193, of the Amalgamated Association of Street Railway Employees of America. Then follows the names of all the strikers and the names of the president and secretary of each of fourteen local unions.

The complaint then includes among the defendants all other associations and persons unknown to the plaintiff, and engaged in the acts complained of, citing them to appear before the Superior Court on the first Tuesday of April to answer to the action.

The law-abiding citizens of Waterbury are rejoicing over the injunction obtained by the company, and the unions, while they profess to be unconcerned, are dismayed at the action that has been taken. As evidence of the serious turn affairs have taken for the unions, the presence in Waterbury of W. D. Mahon, president of the American Association of Street Railway Employees, and Treasurer Orr, of the same association, testifies. Mr. Mahon arrived in Waterbury on March 16, and immediately had a consultation with the executive committee of the strikers and the members of the national board. At the close of the conference, Mr. Mahon issued a statement announcing that it was the intention of the strikers, with the assistance of the national body, to fight the company to a finish. That this declaration of Mr. Mahon was a hasty one is shown by the fact that at his request the representatives of the union met the representatives of the company on Tuesday, March 17, to discuss the question of a settlement of the differences. This conference, the first since riotous demonstrations, was a farce. If unofficial reports are to be given credence, neither side seems to have acted with the decision of men determined to end an intolerable condition of affairs.

The serious turn affairs have taken since the murder of Policeman Mendelssohn has had its effect on the lawless element. While demonstrations against the company continue, they are for the most part confined to offenses for which no punishment is prescribed by law. On March 12 a car on the Naugatuck line was derailed by a stone placed on the track, and it was necessary to send to this city for the repair car before the trip to this city could be resumed.

## ANOTHER SYSTEM TO EXTEND FROM TRENTON

The Trenton, Lakewood & Atlantic Railway has been incorporated in New Jersey for the purpose of constructing an electric railway between Trenton and Point Pleasant, on the coast. The company has an authorized capital of \$1,000,000, and has deposited the necessary \$80,000 with the State Treasurer to insure the building of the 40 miles of road planned. The incorporators are: George O. Vanderbilt, Albert D. Cook, of Princeton; Thomas R. Allen, Jasper H. Allen, Peter Schlieher, William Allfather, Richard H. Page, of Trenton; William B. Mills, of Mount Holly; A. B. Harring, of Frenehstown; Jacob Wycoff, of Princeton Junction; James C. Robbins, of Hamilton Square; Albert S. Eckel, of Milford. The office of the company is at 135 East State Street, Trenton.

It is proposed to build a high-speed electric railway from a point on Pennington Avenue, Trenton, crossing the Trenton, Lawrenceville & Princeton Railroad, the Trenton Street Railway, the main line of the Pennsylvania Railroad, the Trenton & New Brunswick Railroad, the Camden & Amboy Division of the Pennsylvania Railroad (near Robbinsville) the New Jersey Southern Railway, the Philadelphia & Point Pleasant Division of the Pennsylvania Railroad, and possibly one or two more lines. The only towns en route will be Allentown and Lakewood. The company will build over a 60-ft. right of way the entire length. It will be a single-track line, but preparations will be made for a double track in the near future. The company has taken out a steam railroad charter, thus enjoying all the privileges of a steam railroad.

## NEW YORK CENTRAL TERMINAL BILL PASSED

The Assembly has passed the Bedell bill, authorizing the New York Central Railroad to make extensive improvements to its New York city terminal. It authorizes the Board of Estimate and Apportionment to make the grants to the company necessary for the improvements. It also permits the depression of the tracks and the building of streets over them, of the cost of which the city is to pay \$600,000, while the railroad is required to pay \$25,000 a year for the use of the sub-surface of the streets. The use of steam below Harlem is forbidden, and the substitution of electricity or any motive power other than steam, and which does not involve combustion in the motors themselves, is required. The work of improvement is to begin in thirty days from the date of permission and to be completed in five years.

## GOVERNOR OF MASSACHUSETTS FAVORS GENERAL FREIGHT LAW

Governor Bates, of Massachusetts, in returning to the Legislature, with his veto, the act to authorize the Fitchburg & Leominster Street Railway Company to act as a common carrier between the town of Lunenburg and the city of Fitchburg, declares himself in favor of a general law that will render unnecessary special acts in order to secure freight privileges.

Governor Bates does not object to street railways acting as common carriers of parcels, baggage and certain classes of freight whenever the public convenience demands it, but he is opposed to the unnecessary multiplication of special acts granting special privileges. Nine special bills of this character were enacted last year, and since 1890 seventy such bills have become law, and many petitions for similar special legislation are pending at the present time. This indicates, the Governor says, the necessity for a general law that shall cover all such cases and render special acts unnecessary.

The Governor, recognizing that the local authorities are best qualified to determine whether or not the conditions in their respected communities require the granting of such privileges, and also that outside of the local considerations involved there are involved the rights of the general public, suggests the enactment of a general law giving street railway corporations the rights in question whenever they have obtained the consent of the local authorities, together with the approval of the Railroad Commissioners after public notice and hearings. The Governor believes that a law of this kind would provide for all cases of this kind in such a manner as to do equal justice and protect all interests.

Since the return of this bill to the Legislature there has been introduced by House Chairman Frothingham, for the street railway bill, giving to all street railway companies under certain conditions the right to act as common carriers. The bill provides:

"Street railway companies are hereby authorized to act as common carriers of baggage and freight, provided, however, that no such company shall so act in any city or town until it has secured the consent of the Board of Aldermen or Selectmen, or those exercising the powers of such boards, and the certificate of the Board of Railroad Commissioners that the same is consistent with public necessity and convenience, public notice and hearing being given in both instances; and provided further, that said companies shall be subject to such regulations and instructions as may from time to time be made by such local authorities and approved by said State Board, and shall also be subject to the provisions of all laws now or hereafter in force relating to common carriers."

## ELEVATED EMPLOYEES' DEMANDS IN NEW YORK

A sub-committee of the executive committee of the new organization of Manhattan Railway Company employees called on the officials of the company on Monday, March 16, and submitted a new wage and hour schedule. It is understood that the chief request made by the sub-committee was for a nine-hour workday. The men say they have six trips a day, and that it requires over ten hours to complete the trips. The six-trip system cannot be brought within even the ten-hour limit under present conditions, they say. Formerly, the men say, they were allowed an hour's pay for a fraction of an hour's overtime. Now they must work the full hour to get extra pay, and the pay is 23 cents for a conductor and 18 cents for a first-grade guard. It is emphatically denied by the representatives of the union that a strike is intended.

## EXPOSURE OF ALLEGED STREET RAILWAY SWINDLERS

The exploits of Maurice J. Cocoran and Rose Cocoran, or Cohen, in victimizing street railway companies and the abrupt termination of their operations form an interesting chapter in this class of litigation. The man was born in Boston and is about thirty years of age, and the woman hails from New York. In two years they have obtained considerable sums of money from street railway companies, it is claimed, on representations that the woman had been thrown to the ground by the premature starting of cars. The game was worked successfully in Boston, in Worcester and in Providence, but it failed in Hartford.

The exploit which terminated their career for the time being occurred on the South Middlesex Street Railway on the evening of April 9, 1902. At a point on the highway where there is a grade crossing the woman claimed to have been thrown to the ground by the sudden starting of the car while the conductor was flagging the crossing. The circumstances excited suspicion and a thorough investigation was made. Correspondence with counsel of railways in other cities disclosed the operations of the pair in the places mentioned, and a snap-shot of the couple was secured on the street, making their identity complete. Two suits were brought against the South Middlesex Company, one by the woman for her personal injuries and the other by the alleged husband for expenses pertaining to the woman's illness and for loss of her services. At the trial both testified that they were about to take the car, and that by reason of its sudden starting without signal the woman was thrown down as she was on the point of stepping upon the platform. The evidence introduced by the company showed that the woman was alone; that she had secreted herself behind a pole and some shrubbery, where she remained for nearly an hour, permitting at least one car, which she might have taken, to pass, and that finally, when the car which was alleged to have been the occasion of the accident was about to start she ran out from her hiding place, and when within two feet of the car dropped to the ground; that when she was assisted to a drug store by several of the witnesses she gave an assumed name, would receive no attention from any one, least of all from the doctor who was called for the purpose of relieving her assumed distress, and that during the entire time Cocoran himself was not present. At the conclusion of the company's evidence Judge Stevens ordered Cocoran under arrest, but as he had bolted from the court room immediately after his cross-examination the company's witnesses were sent before the grand jury, who found bills against both man and woman for perjury. The officers have been unable to find Cocoran, but the woman was arrested at her home and is now awaiting trial.

## STREET RAILWAY FRANCHISE GRANTED IN NEW YORK

The Board of Aldermen of New York, at a meeting held on Monday, March 16, granted to the New York City Interborough Railway Company a franchise to operate an electric railway system on 36 miles of streets in the Borough of the Bronx. The franchise was put through the last detail provided in the charter. In many particulars it differs from any which the city has granted since the formation of Greater New York, and the Mayor and Controller declare that they have made better terms than have ever been made by the city with a railroad corporation.

The city will obtain for the franchise a sum not less than \$15,000 a year for the first five years, or 3 per cent of the gross receipts of the company. During the remaining twenty years of the franchise the city will receive 5 per cent of the gross earnings, and the annual payment must be \$30,000.

Another sum is to be obtained for the use of the following bridges: Central, or Macomb's Dam, Bridge; Washington Bridge, Bronx Bridge, from First Avenue, Manhattan, to Willis Avenue, the Bronx, and Lenox Avenue Bridge. For the use of each bridge the city will receive \$4,000 during the first term of five years, \$4,500 during the second term of five years, \$5,000 during the third term, \$5,500 during the fourth term, and \$6,000 during the last five-year term of the lease.

The city can renew the franchise for a term of twenty-five years, but the company must pay a higher price. Upon the termination of the franchise the city has the right to acquire the plant and property necessary for traction purposes, including all equipment, at a fair valuation, excluding any value derived from the franchise.

The New York City Interborough Railway Company is a new corporation, formed for the purpose of obtaining franchise rights in the Bronx. Everett P. Wheeler represents the company.

## SALE OF THE NEW HAVEN CAR REGISTER COMPANY

An important consolidation of register interests was announced last week through the sale by the New Haven Car Register Company of its entire business, including good will, patents, machinery, tools, stock, etc., to the International Register Company, of Chicago. This company is already a most prominent factor in the register trade, and the control by it of all the New Haven patterns will give it a very strong position in the field.

The International Register Company is now prepared to make immediate deliveries of its well-known machines, and will fill orders for the New Haven types as soon as possible, after the arrival in Chicago of the material and stock from New Haven.

Willis M. Anthony, president; Fred C. Boyd, vice-president and general manager; John S. Bradley, secretary and treasurer, of the New Haven Company, will remain identified with the register business, as they have become stockholders of the International Register Company.

The deal was consummated through the efforts of H. E. Beach, in connection with the officers of the two companies.

## THE PHILADELPHIA BRANCH OF THE A. I. E. E.

The first regular meeting of the Philadelphia branch of the American Institute of Electrical Engineers was held at the Engineers' Club, 1122 Girard Street, March 9. There was a short business session, during which Carl Hering was elected chairman; H. F. Sanville, secretary, and Charles Hewitt, W. C. L. Eglin, J. F. Stevens, H. A. Foster and Theodore Spencer, members of the executive committee.

W. L. Bliss then presented his paper on "Railroad Train Lighting," and W. C. L. Eglin presented abstracts of the papers of Messrs. Farnsworth and Sperry on the same subject, read at the New York meeting.

A spirited discussion was opened by Dr. C. B. Dudley, of the Pennsylvania Railroad Company, and carried on by W. L. Bliss, Hugh Lesley, C. J. Reed, Mr. Spalding, J. B. Klumpp and others. The meeting was well attended, every seat in the room being filled. Representatives of all the large steam railroads running through Philadelphia were present.

The next meeting of this branch will be held on Monday night, April 6.

## UNION TRACTION OF INDIANA EXTENDS OPERATIONS

At the annual meeting of the stockholders and directors of the Union Traction Company of Indiana, at Anderson, Ind., on Saturday, March 14, final steps were completed for the merger of the company's lines with those of the Indianapolis Northern Traction Company, connecting Indianapolis with Peru and Logansport. This gives the combined companies 450 miles of electric interurban trackage, connecting the principal cities of Central and Northern Indiana, and a capital of \$9,000,000. The plan of the merger was completed by the adoption of the following resolution:

"That both the common and preferred stock of the Union Traction Company shall participate proportionately in the division of the common stock of the Indianapolis Northern Company, which company is and shall be a leased and constituent part of the Union Traction Company."

The formal distribution will take place on April 4. The officers elected were: George F. McCulloch, Indianapolis, president; Philip Matter, of Marion, vice-president; J. A. Van Osdol, of Anderson, secretary; W. C. Sampson, of Muncie, treasurer; J. Levering Jones, of Philadelphia; Randall Morgan, of Philadelphia; W. Kessler Schoepf, Cincinnati, directors.

## EQUIPMENT FOR COAST RESORT RAILWAY

The Atlantic City & Suburban Traction Company is constructing a suburban electric railway extending from the famous board walk at Atlantic City to Pleasantville, N. J., from which place the road will branch in two directions, one leading to Absecon, and the other to Somer's Point, a total distance of approximately 18 miles. This road will operate twelve cars, each being equipped with four Westinghouse 12-A motors, and five trail cars. The following electrical apparatus is also to be installed in the power house at Pleasantville: Two 400-kw direct-current Westinghouse railway generators, running at 550 volts, and 125 r. p. m., together with a switchboard, which will be of the standard Westinghouse railway type and consist of two generator panels, one load panel and four double-feeder panels.



**AN EFFORT TO SECURE LOWER FARES IN YORK HAVEN**

An effort is being made to secure lower street car fares in New Haven, Conn. A committee of the Board of Aldermen was appointed to consider the question of a 4-cent fare, and after a visit to some of the cities in which less than a 5-cent fare prevails the committee has reported that it is of the opinion that the Fair Haven & Westville Railroad, which controls all the lines in New Haven, could give a 4-cent fare and still pay dividends of 6 per cent on the capital invested. Tom L. Johnson, of Cleveland, is said to have told the committee that it would be comparatively easy to secure the construction of independent lines at New Haven on a 3-cent fare basis. The committee favors the purchase of the Fair Haven & Westville Company by the city in case the officials of the company are not inclined to grant the cheaper fare. James S. Hemingway, president of the Fair Haven & Westville Railroad Company, has informed the committee that the fare is now as low as practicable and that the company is for sale only by vote of the stockholders.

**NEW CARS RUN INTO BOSTON**

The Newton and Boston lines of the Boston Suburban Electric Company opened service direct from Waltham to the Park Street subway station on Feb. 28, 1903. The cars used on the line were built by J. M. Jones' Sons, of West Troy, N. Y., and except for color are identical with those now operated by the same company between Norumbega Park, Auburndale and Park Street. The service is maintained on a fifteen-minute headway, the running time from the new car house on upper Main Street, Waltham, to the Park Street subway station being about one hour. Two 5-cent fares are collected, registers being changed at Watertown Square in Watertown, where the Boston Elevated Railway Company's crews take the cars and run them into the subway and back. From Watertown to Park Street requires about forty minutes. The round trip, including a ten-minute layover at Waltham, occupies about two and one-quarter hours. Cars leave Waltham at 6:31 a. m. and every quarter hour until 10:31 p. m. for Boston. No layover is, of course, permitted on the Park Street loop in the subway.

Thirteen new cars were purchased for this service. Each is painted red, with yellow trimmings, and presents a handsome appearance, being finished in mahogany, with monitor-type roof extending the entire length of the car. The seats are longitudinal and carry thirty-four passengers. On each side of the car are nine windows, while light is provided at night and in the subway by eight incandescent lamps set over the seats in the roof. The cars are thoroughly vestibuled, and substantial brass grab handles are located horizontally near the doors. Vertical grab handles of wood are placed at the entrances to the car. A single trolley is used. Fares are recorded on a cash register of New Haven make, and Consolidated car heaters are employed. Push buttons and bells for signalling stops are provided, and thick curtains are placed to cut off the light between car interior and vestibule in night running. The motors are two G. E.-67's rated at 38 hp each, mounted each separately on a single Taylor truck. The brakes are Christensen straight air, with supplementary hand brakes, and the motor controller is the General Electric Company's Kro. The body length inside is 25 ft. This paper is indebted to Superintendent Smith for the above information.

**A NEW ROAD FROM ST. LOUIS**

Preliminary work has been begun by the St. Louis, Hillsboro & Southern Railroad, organized in 1902 under the railroad laws of Missouri, on an electric railway that is to extend from St. Louis to Hillsboro, the county seat of Jefferson County. The work now under way is on some of the rock cuts, but active work along the line is to be begun at once. It is planned to build a combined freight and passenger road, but the question of whether the overhead trolley or third-rail systems shall be adopted has not yet been decided. Building between the Iron Mountain, which runs on the eastern border of the county, and the Frisco passes outside the western border, leaving a distance between the two of 10 miles to 40 miles. The new road will run through a country entirely without railroad facilities. This stretch of country supports a population of some 40,000 people, and consists of farming and timber lands. The lack of convenient transportation, however, has hampered developments. The road is to be under the management of T. F. Sneed, formerly superintendent of the St. Louis & Suburban Railways, and later with the Belleville line at Belleville, Ill. Mr. Sneed will also fill the position of president. Dr. H. D. Brandt is vice-president and secretary,

while H. W. Femmer is treasurer. They are both of St. Louis. The directorate is composed of these three gentlemen and G. W. Wall, of St. Louis, and E. A. Weiss, of New York. It is proposed to erect a fine terminal station at South Broadway and the River des Peres, St. Louis.

**BIG TRAFFIC GROWTH ON METROPOLITAN ELEVATED**

The Metropolitan West Side Elevated Railroad Company, of Chicago, has finished a prosperous fiscal year. February showed an increase of 15.5 per cent over the previous year. September showed 21 per cent increase. The following are the traffic figures:

	1902-3	1901-2	Increase
March.....	105,512	98,739	7,173
April.....	109,246	97,018	12,228
May.....	105,199	92,572	13,227
June.....	101,743	86,179	15,564
July.....	97,929	79,302	18,627
August.....	100,099	81,256	18,843
September.....	100,751	88,226	21,525
October.....	115,980	96,020	19,960
November.....	110,289	97,337	12,952
December.....	115,682	100,770	14,912
January.....	112,171	98,029	14,142
February.....	116,090	100,466	15,624

**RAILROAD CONFERENCE AT TOPEKA**

The eleventh International Railroad Conference of the Young Men's Christian Associations, which will be held at Topeka, Kan., April 30 to May 3, will give particular attention to the recent introduction of association work among street railway companies. This will be the subject of an address by T. J. Nicholl, vice-president and general manager of the Rochester Railway Company, which company has recently organized a branch of the Young Men's Christian Association for work among its employees.

President Roosevelt has signified his purpose to attend this conference, and to speak in behalf of this work for railroad men. Among the other speakers announced are Governor Bailey, of Kansas; Joseph Ramsey, Jr., president of the Wabash Railroad; H. U. Mudge, general manager of the Achison, Topeka & Santa Fe Railway, and Rev. J. Wilbur Chapman, D. D. Colonel John J. McCook, chairman of the railroad department of the international committee, will preside at this conference. It is expected that from twelve to fifteen hundred delegates will be present, including representatives from several foreign countries. Inquiries for information should be addressed to the Railroad Department, International Committee, Young Men's Christian Associations, 3 West Twenty-Ninth Street, New York.

**TOPICS OF THE WEEK**

In an article entitled "Ancient Prophecies Fulfilled," in Four-Track News for March, George H. Daniels says: "From the earliest times transportation has been an important feature in the development of the church. You will remember what serious times St. Paul had in his travels, and it is curious to note how clearly various forms of transportation of to-day were outlined in the Old Testament scriptures, and especially in the prophecies of a thousand years before the beginning of the Christian era. For instance, Nahum, in the fourth verse of the second chapter of his prophecy, evidently refers to automobiles, as follows: 'The chariots shall rage in the streets, they shall jostle one against another in the broad ways; they shall seem like torches, they shall run like the lightnings. He no doubt had in mind the crowded condition of the street cars and the elevated railways in New York when, in the eighth verse of the second chapter, he says: 'Stand, stand, shall they cry, but none shall look back.'"

Very few people living in New York have failed to recognize the fact that all the transportation facilities possible should be developed and impressed to their greatest capacity, yet some radical reformers are willing to cripple the present service and eventually destroy the existing system altogether in order to advance their own pet schemes. Ex-Senator John Ford, author of the Ford Franchise Tax bill, appeared before the Rapid Transit Commission last week and urged the rejection of any plans for improving elevated railroads, as he declared the board should adopt the policy of ridding the city of such roads altogether. He said both elevated roads and surface tracks ought to be abandoned, ultimately, in the downtown district, leaving the streets entirely free for trucks, other vehicles and pedestrians.

Positive identification has been made of the man in the county jail at Northampton, Mass., awaiting trial for breaking and entering the car house of the Northampton Street Railway Company some time ago as Richard Mack, alias Robert Morrison. He is believed to be connected with gangs that have been through country towns in New England blowing open safes in postoffices, railroad stations, express offices and street car offices during the past few years. Mack was arrested in Boston in 1894.

A news item in The Syracuse Herald records the attempted shooting of a street car conductor by an Italian who had been carried past the point at which he wanted to get off the car. The Herald says that the conductor, when remonstrated with for not stopping the car promptly, called his passenger a "Guinea," and that the "Guinea," burning with a sense of injustice, got his gun and waited for the return of the car. Fortunately for the conductor and the passengers, no one was injured by the shots fired; the ability of the offended one to shoot was not quite as unerring as that displayed by the gunners of the American boats at Santiago. Granting that the conductor made the impertinent remark already referred to, this is an instance where an opportunity is presented for dealing out punishment that should carry a lesson to all persons who are so ready to resort to strenuous measures when burning with a sense of injustice.

Street railway companies operating in the vicinity of Pittsfield, Mass., have had an unusual difficulty to contend with during the recent cold weather. The private telephone used for signal service got out of order, and an investigation disclosed the fact that a thin coating of ice had been formed over the transmitter, thus effectually preventing the operation of the instrument. It was suggested that the moisture from the breath of the employee using the telephone had frozen or that the instrument had acquired the moisture from the atmosphere just before a sudden lowering of temperature, which had resulted in the formation of the icy scale in the mouthpiece.

Under the caption, "Device to Protect Firemen," the Bangor Daily News, in a recent issue, publishes the following statement: "Firemen are often endangered in the performance of their duties by the trolley wires of street railways or by telephone wires falling across them. To do away with such danger Superintendent George W. Walker, of the Portland, Ore., fire alarm telegraph, has devised a plan for taking the current off the trolley wires. This is done by a rod of iron with a hook at one end to hitch over the wire, and a shoe at the other end to place on the car track. This rod is enclosed in a wooden stick which has been split in halves, and a groove hollowed out in each into which the rod fits. The poles are then covered with cord protected with shellac, varnish or something of the sort, which insulates it. By hanging one of these poles on the trolley wire and placing the shoe at the other end on the track, the current is diverted to the ground, and the cars are stopped, and the danger of the firemen being shocked or disabled by the current done away with." The effect on the man who tried to apply this device to a circuit supplied by a generator of say 1500 kw. would be interesting. The clipping was sent to this office by C. F. Pray of the Calais, Me., Street Railway Company.

## STREET RAILWAY PATENTS

UNITED STATES PATENTS ISSUED MARCH 10, 1903

722,280. Convertible Car; J. A. Brill and H. E. Haddock, Philadelphia, Pa. App. filed May 24, 1902. Relates to means for changing a "winter" or closed car to a "summer" or open car by a system of sliding, flexible panels.

722,378. Car Wheel; H. I. McGuire, Cincinnati, Ohio. App. filed May 17, 1902. Relates to the construction of an insulated car wheel designed to prevent currents of electricity from being conveyed through the axle to the rails or from the rails through the axle.

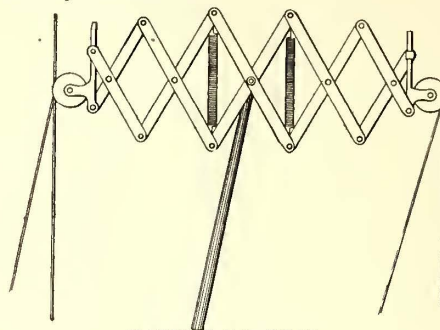
722,379. Trolley Pole; H. P. Oler, Camden, N. J. App. filed Aug. 9, 1902. The trolley wheel is rotably mounted on an axis in line with the pole so that it will tilt in passing a curve.

722,502. Means for Handling Cable-Drawn Cars on Inclines; T. A. Edison, Orange, N. J. App. filed Jan. 9, 1903. In apparatus for handling cable-drawn cars the combination of a main incline, a horizontal extension at the top thereof, an auxiliary incline, a cable and means for operating the same.

722,527. Electric Controller; F. A. Merrick, Johnstown, Pa. App. filed Oct. 14, 1902. Contacts and connections arranged to place a motor in parallel with the armature and a part of the field winding of another motor, the balance of the field winding being in series with the parallel circuits.

722,579. Fender or Safety Device for Vehicles; C. E. B. Heibig, Dresden, Germany. App. filed Jan. 29, 1902. Details.

722,608. Trolley for Electric Railways; R. L. McCartney, Ottumwa, Ia. App. filed Dec. 12, 1902. Relates to means for retaining the trolley on the wire.



PATENT NO. 722,654

722,654. Trackless Trolley; A. B. Upham, Boston, Mass. App. filed April 25, 1901. "Lazy-tongs" having a trolley at each end are horizontally supported by the trolley pole and pivotally connected therewith, thus permitting the vehicle to wander considerable distance either side of the conductors.

12,098. Electric Brake for Vehicles; J. N. Mahoney, New York, N. Y. App. filed Jan. 14, 1903. A controller in which current generated by the motors when disconnected from the line is utilized in a special manner to operate electric brakes.

## PERSONAL MENTION

MR. JOHN S. BIOREN has been appointed a member of the executive committee of the American Railways Company.

MR. H. H. PATRICK has been appointed superintendent of the Bristol County Street Railway Company, of Attleboro, Mass., in place of Mr. C. D. Stevenson.

MR. GUY W. BUXTON, who has been for sometime connected with the New York office of the H. W. Johns-Manville Company, has been recently appointed auditor of that company.

PRESIDENT R. D. GILLET, of the Berkshire Street Railway Company, of Pittsfield, Mass., is on a pleasure trip through the South. Incidentally he has been looking over some Southern street railways.

MR. EDWARD BLAIR, who has been assistant to the general manager of the Quebec Electric Railway, of Quebec, Que., has been appointed assistant superintendent of the Montreal Street Railway, of Montreal, Que., under Mr. Luke Robinson.

MR. WALTER H. ABBOTT, of Cleveland, consulting engineer for the Pomeroy-Mandelbaum properties, was married March 5 to Miss Winifred M. Manlove, of Cleveland. The bride and groom are now on a wedding journey in Southern Ohio and Kentucky.

MR. W. K. MORLEY, of Louisville, formerly superintendent of the St. Louis-Louisville Division of the Southern Railway, has been elected vice-president and general manager of the Grand Rapids, Grand Haven & Muskegon Electric Railway Company, of Grand Rapids, Mich.

MR. C. O. FITCH has resigned as electrician of the Hudson Valley Railway, of Saratoga, N. Y., to resume his old position as chief electrician of the Cudahy Packing Company's plants at Omaha. Mr. Fitch will be succeeded at Saratoga by Mr. Robert L. Fryer, of England.

MR. L. A. ATHERLY-JONES, K. C., M. P., has been elected president of the Tramways & Light Railways Association of Great Britain. Mr. Atherly-Jones was vice-president of the association last year, and was one of the speakers at the banquet of the International Tramway Association in London, July 4, 1902.

MR. JACOB R. BEETEM, vice-president and general manager of the New York & Queens County Electric Railway, of Long Island City, N. Y., which operates branches through the Borough of Queens and extends into Nassau County, has resigned his office with that company. His resignation is to take effect April 1.

MR. H. E. BEACH, who has been for some time past connected with the New Haven Car Register Company, will in future represent the Sterling-Meaker Company, with headquarters at Newark. Mr. Beach has a wide acquaintance in the electric railway field, and his many friends will wish him success in his new venture.

MR. C. B. BUCHANAN, who has been for some time superintendent and traffic agent of the Manchester Division of the Virginia Electric Railway & Development Company, has been promoted to

the position of superintendent of transportation for all lines of the Virginia Passenger & Power Company, in Richmond, Manchester and suburbs, with headquarters at Richmond.

MR. BEVERLY R. VALUE, third division engineer of the Rapid Transit Commission, has resigned to accept a position with the Toronto Light & Power Company. He has had charge of the underground work north of 104th Street, on the Manhattan-Bronx Subway. Mr. C. V. R. Powers, now chief assistant to Mr. Value, has been chosen as the latter's successor.

MR. WILLIAM McPHERSON, who has been connected with street railways in the vicinity of Worcester, Mass., for the past twelve years, died at Charlton, Mass., March 8. He was superintendent of construction work on the old Worcester & Suburban, and was employed in the same capacity in the construction of the new Worcester & Southbridge Street Railway.

MR. A. S. RICHEY, chief engineer of the Union Traction Company, of Indiana, addressed the Electrical Engineering Society, of Purdue University, on Monday evening, March 2. "The Proposed Electric Layout of the Indianapolis Northern Traction Company and the Manner of Distributing Power Over the System from the Anderson Power Station," was the subject of the address.

MR. W. KESLEY SCHOEPF, president of the Cincinnati Traction Company, left Cincinnati last week for Washington, and after a brief stay there he will sail for Europe, to be gone several months. He will be accompanied by Mrs. Schoepf. It has been rumored that Mr. Schoepf has been considering a proposition to take charge of the consolidated urban traction lines of Paris, but his intimate friends say his journey is merely for the purpose of rest and recreation.

IN addition to the recent appointment of Mr. A. A. Anderson as general superintendent of the Union Traction Company of Indiana, mentioned in a recent edition of this paper, there have been one or two other changes in the personnel of the company. Mr. C. A. Baldwin, formerly assistant superintendent of the company, has been appointed superintendent of transportation, and Mr. J. L. Matson, formerly master mechanic, has been appointed superintendent of motive power.

MR. WILLIAM F. AGATE, formerly vice-president and general manager of the New Jersey Car Advertising Company, controlling the advertising privileges of the North Jersey Street Railway Company, recently resigned that position to accept an appointment as advertising manager of the Consolidated Railway Advertising Company, of New York and Baltimore. This company controls the advertising privileges on cars in all parts of the United States, including many large cities, and is extending its list of cars.

MR. HOWARD E. HUNTINGTON, who recently completed an engineering course at Harvard, has been appointed assistant to the general manager of the Pacific Electric Railway Company at Los Angeles, Cal. Mr. Huntington is the son of H. E. Huntington, president of the company. He is a young man of five years' practical railroading in addition to his technical training in the schools. General Manager Epes Randolph welcomes an assistant, for, with the rapid growth of the company's many interurban lines out of Los Angeles, his duties have lately multiplied almost beyond performance.

THE JURISDICTION OF MR. C. W. KING, train master of the Colorado Springs & Cripple Creek District Railway Company, of Colorado Springs, Col., has been extended over the entire system, including both steam and electric lines. Mr. King is also appointed car accountant, and all reports and matters pertaining to passenger and freight equipment will be handled by him. The jurisdiction of Mr. Owen Owen, master mechanic of the company, has been extended to include the electric lines. Mr. Owen will be in charge of the power plants and all electric equipment.

MR. ALBERT T. POTTER, general manager of the Rhode Island Company, of Providence, R. I., has been elected vice-president of the company, and Mr. Robert I. Todd has been elected to succeed Mr. Potter as general manager. Mr. Potter has been continuously engaged in active work for local street railway interests at Providence since 1866. For fifteen years Mr. Potter was general manager of the local roads at Providence. It was in June, 1875, that he assumed his first title, that of assistant general manager. Three years later he was chosen general manager of the company. After nearly forty years of active service Mr. Potter welcomes the opportunity that his new position gives him of being relieved of the cares of active management.

MR. WILLIAM JENNINGS, for many years superintendent of the mechanical department of the Mexican International Railroad, with headquarters at Ciudad Porfirio Diaz, Mexico, has gone to Los Angeles, Cal., to accept a similar position with the Pacific Electric Railway Company, the interurban road owned by the Huntington-Hellman syndicate. The position is newly

created, and the mechanical superintendent will have general charge of the operation of the three departments heretofore known as the mechanical, power and electrical departments, which hereafter will be known as the mechanical department. Under the new regime Mr. Jennings reports direct to General Manager Randolph, who thus deals with one man, instead of three. The rapid growth of the company's business necessitated the new arrangement. The heads of the old departments remain unchanged and report to Mr. Jennings, instead of the general manager.

MR. HENRY C. PAGE, who for the past two years has ably managed the Boston & Northern Railroad, is about to relinquish his duties and go to Pittsfield, where he will become general manager of the Berkshire Street Railway Company, which operates between Pittsfield and North Adams and Pittsfield and Lenox, Mass. Mr. Page was born in Brownville, Me., June 19, 1863, was educated in the public schools and at the Somersworth, N. H., academy. He began life as a clerk in a store, then came to Massachusetts, and was for three years a conductor of the Lynn and Boston division, being under Mr. E. C. Foster, now general manager of the road, and then in charge of the Chelsea division. Mr. Page became general manager of the Newburyport & Amesbury Street Railway, and was next called to take the position of superintendent of the Salem division of the Lynn & Boston road. When the Boston & Northern road consolidated various lines and Mr. E. C. Foster went from the Lynn to the Boston office as vice-president and general manager, Mr. Page was placed in charge of the Boston & Northern Company.

MR. ROBERT I. TODD, who has just been chosen to succeed Mr. Albert T. Potter as general manager of the Rhode Island Company, of Providence, R. I., is a man of exceptional ability, well qualified by years of experience in the street railway field for the position he is about to assume. He has had experience with all the various methods of street railway propulsion, horse, storage battery, underground electric and single and double trolley. Mr. Todd is a native of New Jersey, having been born near Lakewood, Nov. 29, 1869. His first connection with street railway work was as assistant superintendent of the Eckington, Soldiers' Home & Belt Railway, of Washington, D. C. Later, when this and other companies were merged into the City & Suburban Railway Company, Mr. Todd was made general superintendent and electrical engineer. He resigned from this position in the spring of 1889, to take charge of the experimental work of the compressed air company in New York. In July, 1900, he accepted the position of mechanical engineer of the Consolidated Traction Company, of Pittsburg, which position he held until February, 1901. He resigned at this date to become general manager of the Cincinnati Traction Company, which had recently been taken over by the Widener syndicate. In January, 1902, he was promoted to the position of second vice-president of the company, and in July, 1902, he became connected with the United Gas Improvement Company in Philadelphia, his work being in connection with the company's traction interests.

MR. T. K. GLENN, second vice-president and secretary of the Georgia Railway & Electric Company, of Atlanta, Ga., has been appointed first vice-president and manager of the railway department of the company to succeed Mr. D. A. Belden, resigned. Mr. Glenn, the son of a prominent Methodist minister, was born in Vernon, Miss., thirty-four years ago. He was educated in the common schools of Marietta and Atlanta, and later entered a private school. The first position accepted by Mr. Glenn was with the Maddox-Rucker Banking Company, of Atlanta. He remained with the bank three years as a collector. On the consolidation of the street car companies of the city by Mr. Joel Hurt into the Atlanta Consolidated Street Railway Company, Mr. Glenn was given a position with the company as stenographer. He very soon began to show a ready acquaintance with the business of the company and was becoming valuable, not only as a rapid stenographer, but for his fine sense and good business judgment. In the course of a short time he was made claim agent for the company. This position he filled with great credit to himself and entire satisfaction to the company. Barely had he taken the work of claim agent well in hand when he was advanced to the office of secretary and treasurer. This latter position Mr. Glenn held until 1898, adapting himself to the duties of the office in a remarkable manner. In 1898 Mr. Glenn was made vice-president of the company. He held this position when the company changed its name to the Atlanta Railway & Power Company, and in 1901, when the Atlanta Rapid Transit Company bought the Atlanta Railway & Power Company, Mr. Glenn was made vice-president and secretary of the Georgia Railway & Electric Company, which was the title assumed by the consolidated companies. Mr. Glenn enters upon his new duties with especial fitness, for in his connection of twelve years with the street railway companies of Atlanta, he has become familiar with all the details of the systems.

## NEWS OF THE WEEK

### CONSTRUCTION NOTES

**ANNISTON, ALA.**—Work has begun on a general system of improvement on the lines of the Anniston Electric & Gas Company. In most sections of the city the track will be relaid with heavier rail, and in many cases doubled. The boiler capacity of the power house will be increased and facilities provided for new cars, which will be purchased.

**BIRMINGHAM, ALA.**—The proceeds of the \$1,500,000 of additional stock to be issued by the Birmingham Railway, Light & Power Company will be used in increasing the power station facilities of the company. It is intended to add a new building, 100 ft. x 150 ft., to install a battery of new boilers, and to put in service two new engines. The work of doubling the capacity of the power house was begun some months ago, and is only now being finished. When the work was begun it was thought that the additional equipment would be sufficient for the demands of the city for several years, but it was seen before work was fairly begun that it was not adequate for the requirements. Under this issue of new stock the capacity of the gas plant will be largely increased. Improvements being made or finished recently have cost the company \$1,500,000.

**HARRISON, ARK.**—The Ozark & Sulphur Mountain Traction Company has been incorporated to build an electric railway between Harrison, Boone County, and Keener, on the projected White River Railroad, also to Bellefonte, Boone County, and Sulphur Mountain, in Newton County, with the privilege of extending to Jasper and Murray, Newton County, to Dodd City, Marion County, and Lead Hill, Boone County. The capital stock is \$600,000, of which \$50,000 has been subscribed. The officers of the company are: W. G. Gardiner, of Toledo, Ohio, president; Allen Smalley, of Upper Sandusky, Ohio, vice-president; John J. Geghan, of Harrison, Ark., secretary; Neal Dodd, of Dodd City, Ark., treasurer.

**SAN BERNARDINO, CAL.**—The new line of the San Bernardino Valley Traction Company between San Bernardino and Redlands was placed in operation March 8. The company is improving Urbana Springs and Cole's race track to develop both into popular pleasure resorts for the coming summer.

**PASADENA, CAL.**—The City Council has granted the Pacific Electric Railway Company permission to lay tracks and turnouts inside the city limits, looking towards greatly enlarged car houses here, and other improvements. Work has been begun.

**LOS ANGELES, CAL.**—The Los Angeles Railway Company has awarded the Electric Storage Battery Company, of Philadelphia, a contract for a storage battery installation involving about \$250,000.

**FRESNO, CAL.**—S. N. Griffith is about to make another application for a franchise for his proposed road to Clovis.

**EUREKA, CAL.**—The City Council has granted George Henderson, of Oakland, representing San Francisco capital, the franchise for the construction of an electric railway in Eureka. Mr. Henderson is said to have acquired large water rights on the Klamath River, where he will erect a power plant.

**SAN JOSE, CAL.**—It is reported that arrangements are practically closed for the purchase by a foreign syndicate of the property of the San Jose & Santa Clara Railway.

**VISALIA, CAL.**—John Hays Hammond has filed an application with the Board of Supervisors for a franchise for an electric railway along public highways of Tulare County. Mr. Hammond's business address is 15 Broad Street, New York.

**SAN JOSE, CAL.**—F. S. Granger, manager of the proposed San Jose, Los Gatos & Saratoga Electric Railway, has applied to the Board of Supervisors for a franchise for a second railway to Los Gatos by way of the Meridian Road, Los Gatos. A franchise for this road had been previously granted to G. T. Dunlap, who has assigned his rights to Mr. Granger. Mr. Granger agrees to begin work within sixty days.

**LOS ANGELES, CAL.**—The Los Angeles Railway Company has filed applications with the City Council, asking that franchises inside the city limits be offered for sale, aggregating about 9 miles of double tracks.

**LOS ANGELES, CAL.**—The Board of Supervisors has granted to H. E. Huntington a fifty-year franchise for wharfage privileges into the outer harbor at San Pedro, beginning at the extreme west end of the wharves now in existence and running to the five-fathom curve, a distance of more than 1000 ft. Mr. Huntington is president of the Pacific Electric Railway Company, and the wharf, which will be built at once, is primarily for the use of that company. Work on the extension of its road from Long Beach to San Pedro (a distance of less than 5 miles) is soon to begin. The Board of Trustees of San Pedro has granted the company a franchise, making it possible for the Huntington lines to have easy access to the new wharf. The franchise extends along Fourteenth Street from the northern city limits near Gaffey Street to San Pedro Street, on the water front, thence to the wharf. Mr. Huntington plans spending over half a million dollars on the wharf, and proposes to get into active competition with the Southern Pacific and Salt Lake roads for seafaring freight traffic. In fact, it appears that the Huntington wharf will be better located than those of either of the steam roads. Thus is the reported effort of the Southern Pacific to secure monopoly privileges in certain quarters of the harbor thwarted. Vessels of any tonnage will be able to land at the wharf and discharge freight at wharfage rates fixed by the Supervisors.

**CRIPPLE CREEK, COL.**—The Pike's Peak & Cripple Creek District Electric Railway Company has just been incorporated. The terminus of the line for the present will be at Gillett, but it is the design of the projectors of the road to eventually extend it up to the Peak.

**TORRINGTON, CONN.**—The Railroad Committee of the Legislature has reported favorably the bill to give the Torrington & Winchester Street Railway Company power to issue preferred stock to the amount of \$100,000, and also the bill to extend the line over certain streets in Torrington and Winsted.

**PENSACOLA, FLA.**—The Pensacola Electric & Terminal Railway Company has elected the following officers: W. H. Northup, president; A. C. Bount, Jr., vice-president; DeC. W. Thom, secretary and treasurer; W. A. Bount, attorney; J. C. Dunham, superintendent; W. L. Williams, auditor. The old board of directors was retained. It is expected that the old Barancas dummy line will be electrified and Palmetto Beach beautified.

**SAVANNAH, GA.**—The Savannah Electric Company plans to extend its car houses on Gwinnett Street.

**EAST ST. LOUIS, ILL.**—The St. Louis, Vandalia & Eastern Electric Railway Company, recently incorporated, has applied for a franchise in Effingham.

**DANVILLE, ILL.**—The Supervisors have granted three street railway franchises. One is to the Danville, Urbana & Champaign Railway Company, to operate a line paralleling the Big Four tracks on the roads west of the city. The other two grants are to the Paxton, Danville & Wellington Railroad company to construct a line from Ellsworth Park dam north and northwest through Vermilion Heights, through Blount, Snyder and Vernal to Henning, and north from Potomac to Bluegrass and Rankin, and for the construction of a line on North Gilbert Street, running north to the top of McMillan's hill, thence east to Vermilion Street, at Winter's corner, thence north along Vermilion Street to Vernal and northwest to Jamesburg and Potomac, thence north to Bluegrass and Rankin.

**GALESBURG, ILL.**—The Galesburg & Aledo Interurban Railway Company is to be incorporated to build the projected electric railway between Galesburg and Aledo. Three routes are being considered for the road. One will go directly west to Galesburg to a point south of Alexis, then north, and to Aledo via Sunbeam. The second will go via Soperville to Alexis to Laoc and Aledo, and the third would miss Alexis, going via Henderson, North Henderson and Viola to Aledo. The officers of the company are: L. W. Sanborn, of Galesburg, president; C. L. Gerould, of Galesburg, secretary and treasurer; J. J. Welsh, of Galesburg, attorney; A. L. Richey, of Galesburg, engineer.

**FREEPORT, ILL.**—The Freeport General Electric Company is seeking the passage of a new franchise ordinance. The company, in its application to the Council, states that arrangements have been made to issue new bonds and that \$50,000 of the new issue will be spent in improvements if a new franchise is granted.

**JOLIET, ILL.**—The Joliet & Northwestern Electric Railway Company has been organized, with a capital stock of \$500,000, to build an electric railway from Sandwich to Aurora through Plano and Bristol, with a branch to Morris through Yorkville. It is probable that additional branch lines will be built to Plattville, and probably Newark and Lisbon. A connection between Plattville and Joliet, where connections could be made with the Chicago & Joliet Electric Railway, would complete a line to Chicago. At Aurora connections could be made with the Chicago & Aurora Electric Railway, thus making a route to Chicago.

**GREENUP, ILL.**—The City Council has granted franchises to the St. Louis, Vandalia & Eastern Railroad, recently incorporated, to construct an electric railway through the city of Greenup connecting St. Louis and Terre Haute.

**MATTOON, ILL.**—Surveys are being made by the Central Traction Company for its proposed line between Mattoon and Charleston.

**ROCKFORD, ILL.**—The contract for grading the Rockford & Freeport Electric Railway Company's proposed line between Freeport and Rockford has been awarded to Bracey, Howard & Company, of Chicago. Work is to be begun at once.

**CHICAGO, ILL.**—The Englewood Elevated Railroad Company has been incorporated, with a preliminary capital stock of \$50,000. The plan of the company is to build an elevated railroad to start on the South Side L road at some point between Fifty-Fifth and Sixtieth Streets, running west between these streets to a point between Wentworth Avenue and Wallace Street; thence south to a point between Sixty-First and Sixty-Seventh Streets, and thence west to a point between Centre and Ashland Avenues. There is also to be a branch starting from the new line at some point between Wentworth Avenue and Wallace Street, running south to a point between Sixty-Eighth and Seventy-Second Streets. Leslie Carter, Noble B. Judah, Henry G. Miller, Franklin E. Vaughan and Donald Trumbull are named as incorporators. Mr. Carter is president of the South Side Elevated Railroad, of Chicago.

**GARRETT, IND.**—The Toledo & Chicago Interurban Railway, incorporated under the laws of Ohio recently, is to be an extension of the Toledo & Western Electric Railway, a portion of which is now in operation. The same interests own the Garrette & Western Railway, now under construction. The remaining link will be built to make connections with the system from Toledo to Chicago, with a branch from Goshen to Fort Wayne.

**MARTINSVILLE, IND.**—Track-laying on the Indianapolis & Martinsville Rapid Transit Company's line has reached the public square here, and with the exception of a little ballasting the line is complete between here and Indianapolis.

**RICHMOND, IND.**—The Richmond Interurban Railway Company has been granted a franchise in Connersville.