

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXVII.

NEW YORK, SATURDAY, APRIL 29, 1911

No. 17

PUBLISHED WEEKLY BY
McGraw Publishing Company

239 WEST THIRTY-NINTH STREET, NEW YORK

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TERMS OF SUBSCRIPTION:

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, \$3.00 per year; Canada \$4.50 per year; all other countries, \$6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

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Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the ELECTRIC RAILWAY JOURNAL 8500 copies are printed.

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Public Knowledge of City Schedules

It is a curious fact that most city riders who use the same lines day after day do not know that city cars are dispatched in accordance with a timetable. Their general impression is that the car is seldom at their home corner just when they want it. We do not mean that a company should overcome this difficulty by publishing a time card to cover the heavy traffic hours of the day, but it might be worth while for a company to do so for other periods of the day during which the headway exceeds, say, 10 minutes. Insurance solicitors, collectors, agents and others who do much riding would certainly appreciate such a convenience. Not long ago we heard one life insurance man telling his fellows of a wonderful time-saving discovery, namely, the existence of carhouse schedules with time-point data which he consulted from time to time with great profit in laying out his daily itinerary. Judging from this instance and others, we believe that it would not be a bad idea for a railway company to carry a small car notice mentioning the fact that patrons were welcome to inspect the carhouse schedules at any time. It might be still better to follow the Continental practice of posting a schedule notice in every car. A little thoughtful publicity of this kind ought to obviate a large number of the poor service complaints which are based upon imagination and not on facts.

Criticisms of the Efficiency Engineer

Ever since some rather startling testimony by a prominent Boston lawyer on the rate question before the Interstate Commerce Commission the subject of efficiency engineering has received considerable publicity in weekly and monthly magazines, and it is not surprising that the opposing viewpoint should also have been voiced more or less publicly. Railway managers who have given a lifetime to the study of their work could not be expected to accept with any tremendous amount of enthusiasm or equanimity the charge that they had been entirely wrong in everything which they had been doing, that their shops showed an efficiency of less than 50 per cent; in short, that the steam railroads were wasting through inefficient methods more than \$1,000,000 a day. A note of protest against the general acceptance of such claims, and even against the fundamental principles upon which the efficiency engineers base their theories, was sounded at the Congress of Technology at Boston by Henry G. Bradlee, of the firm of Stone & Webster. In addition to expressing the belief that the field of efficiency engineering was largely limited, as we all know is the case, to installations where the labor problem consists of a continuous repetition of some definite act or series of acts and under conditions which remain practically uniform, he showed that it becomes of still less practical value where, as on most

railway systems, the employees are distributed over many miles of track and a large territory. He concluded by emphasizing the statement that the manager who devotes the greater part of his attention to reducing expenses is by no means always the one who can best satisfy the public, maintain the enthusiasm of the employees and grasp the opportunities for extension when they are offered. This fact is sometimes overlooked in comparing operating costs and ratios.

Another Aspect of the Motorman's Bonus Question

The need for checks and counterchecks where platform men are placed on a bonus system is indicated by an odd controversy which arose recently in Radcliffe, Eng. A labor committee of that town complained that motormen often refused to stop for passengers on signal because of their anxiety to secure high premiums for low current-consumption records. The committee therefore requested the tramways management to return to the straight wages plan of payment. It so happened, however, that the conductors on the same railway receive bonuses in accordance with their success in attracting passengers to their cars and in collecting fares. The management therefore justified its retention of the bonus system by contending that the opposing interests of the conductor and motorman resulted in giving the most satisfaction to the public, to the railway and to the platform employees. Whether the Radcliffe motormen were justly accused or not, the fact remains that there are more angles to the car meter and bonus question than the saving in energy consumption. The manager who places his motormen on a competitive basis must not ignore the possibility that their combined wits may be capable of upsetting his best-laid plans for higher efficiency. To add a premium system for conductors as well seems to us to be not only unnecessary but to involve a number of objectionable features, among them that of interference with and derangement of the schedules. The car meter experience of the Berlin street railway, however, shows that a motorman's bonus system can be kept free from abuses if a careful study is first made to determine what constitutes a fair run under specified conditions. If thereafter any records are better than they ought to be, they should be regarded with mistrust.

Stability of Earnings

New testimony regarding the stability of electric railway earnings is furnished by a compilation in the *Commercial and Financial Chronicle* in relation to gross and net revenues during the calendar years 1909 and 1910. It supports the widely accepted claim that the earnings of properties of this class are ordinarily sustained in a remarkable manner during business depressions. Of 261 electric railway companies which reported only nineteen showed decreases in gross, and these, so far as large properties and amounts were concerned, were mostly instances where unusual conditions prevailed, as in Philadelphia, Columbus and Cleveland. For the total number reporting the gross was \$406,789,018 and the net increase, after deduction of the decreases, was \$29,145,400, or 7.71 per cent. Of the companies which reported, the net revenues are given for only 229, and these show an aggregate of \$151,193,368, a net gain, after deduction of the decreases, of \$10,404,451, or 7.39 per cent. Incidentally it may be mentioned that the operating ratio indicated by the combined results was 59.1 per cent in 1910 and 58.7 per cent in 1909. As the returns included in the

compilation represent those of urban, interurban and suburban lines, and of both large and small companies, they are representative. While steam railroads showed a slightly larger percentage increase in gross, their net revenue gained but one-half of 1 per cent. A similar compilation by the same authority in the previous year showed a gain for the electric railways, as compared with 1908, of 9.6 per cent in gross and 14.8 per cent in net, while in 1908, as compared with 1907, there was a gain of 0.67 per cent in gross and of 2.65 per cent in net. Of course, none of the compilations respecting electric railway earnings is complete for the country as a whole, but the facts herein set forth accord with the records made from time to time in regard to the well-sustained average earnings of electric railways. It is unfortunate that full statements of earnings for all companies are not available, but the fact that they are not casts no shadow upon the substantiality of the returns of hundreds of companies which contribute good average increases through periods of years and prove the well-known tendency of the earnings of such properties.

THE LATEST SUBWAY OFFER

A definite offer to build and operate a comprehensive rapid transit system in New York was presented to the Board of Estimate and to the Public Service Commission on April 25 by the Brooklyn Rapid Transit Company, and according to Mayor Gaynor a decision upon the long-discussed question will probably be reached by these bodies within a week. This seems almost too good to be true. The citizens of New York have been discommoded and their commercial interests have suffered for so many years through the lack of rapid transit facilities that they can hardly believe a beginning of the end is in sight. Necessarily several years must yet elapse before cars are in operation on any part of the new subway system not yet begun, but it will be more easy for New Yorkers to wait once the contract has been signed.

The routes proposed by the Brooklyn Rapid Transit Company do not extend west of Broadway between Vesey Street and Fifty-ninth Street, nor west of Lexington Avenue north of Fifty-ninth Street. Nevertheless, they would permit the supply of an excellent rapid transit service between the principal part of the business district in Manhattan and all parts of Brooklyn. They would also reach Bronx and Queens Boroughs. There are several points of interest in the proposal outside of the route. One is the promise of a 5-cent fare on all parts of the proposed rapid transit system, including the existing elevated lines of the Brooklyn Union Elevated Railway Company and its leased lines and the several proposed extensions, with the exception that at present the company would not give a 5-cent fare for travel to the Coney Island district.

The second point of interest is the terms of operation, which are quite different from those between the city and the operators of the present subway. Briefly, for the "original lines," or those which the company considers would be more profitable, the Brooklyn Rapid Transit Company is to retain from the gross receipts the operating expenses, depreciation, renewals, taxes and insurance and then an amount equivalent to the net earnings of the existing lines which will form part of the new system. From the balance remaining there will then be deducted the interest and amortization on the new capital supplied by the company for construction and equipment and then the in-

terest and amortization upon the cost to the city of the lines constructed by it. The remainder will then be divided equally between the city and the company. For the extensions which may be required by the city later and whose earnings are more problematical the company requires also practically a guarantee of the operating expenses, but offers three-quarters of their net earnings to the city. The amount to be invested by each party to the contract for subway construction and equipment would be between \$60,000,000 and \$75,000,000.

There is no doubt that the Brooklyn Rapid Transit System's proposal would, if carried out, be of great value to the city of New York. Brooklyn would expand enormously and as it is an integral part of the greater city the latter would benefit thereby. Bronx and Queens would also profit materially by the construction of the proposed road. It is true that the terms of operation do not make the city a preferred creditor as regards assets and income as in the present subway, but on such a basis no company could afford to construct and operate anything like such a comprehensive rapid transit system as that now proposed by the Brooklyn Rapid Transit Company. Such a system the city now seems to demand, and we think wisely, even if it has to assume some risk in receiving an immediate return upon its investment. The indirect return to the city from the construction of a comprehensive and well-planned rapid transit system will be worth all that it costs, provided it does not involve the city in municipal operation. This is true independent of the company which will be selected to operate the system.

Undoubtedly the Interborough Rapid Transit Company will now make a proposition to the city for an extension of its system. Mr. Shonts said recently that his company was waiting before doing so only to learn the proposal of the Brooklyn company. It cannot, of course, offer so extended a transportation service in Brooklyn as the Brooklyn Rapid Transit Company without paralleling some of the existing elevated roads of that company, but on the same general conditions it could construct and operate a very extensive system which might serve some of the other boroughs even better. Whatever decision is reached we trust that it will insure the early construction of ample transportation facilities in New York. These the city has never had, and it needs practically all that can be supplied.

IMPROVING EQUIPMENT INSPECTION

The recurrence of defects in car equipment justifies frequent reference to the importance of close and sustained inspection in the carhouse. In the multitude of duties which fall upon the shoulders of the carhouse foreman on a large system it is easy to relax the rigor of various inspection details, with the result that certain kinds of failures tend to multiply in certain months. In the later makes of motors there is a tendency toward narrow air gaps, and unless special pains are taken to watch the condition of shafts and journal boxes trouble is likely to develop through the striking of pole pieces by armatures. It is not unusual to find a motor shaft perhaps 1/32 in. below standard, with the resulting necessity of turning down and sleeving, and in some cases trouble has arisen from the insertion of new shafts of low gage instead of shafts of the proper diameter for the particular motor in hand. The cost of repairing damage arising from rubbing of pole pieces is high, and an accurate and regular inspection of air gap and bearing

conditions soon pays for itself in reduced maintenance costs in the armature shop.

Another source of trouble in service frequently appears in connection with the replacement of coils and other equipment parts. On account of the gradations required in car heating the heater coils may not in some cases be interchangeable, particularly where systems requiring a different number of total coils are used. The issuance of a heater-coil data sheet to carhouses enables the proper coils to be ordered for the particular car equipment in hand and serves to caution the local force against putting the coils of the wrong circuit into the wiring of a car equipped with coils of differently standardized resistance. The heater maintenance practice of the Brooklyn Rapid Transit System, described in the *ELECTRIC RAILWAY JOURNAL* for Feb. 18, 1911, not only calls for the use of careful data sheets, but also demands that the repair work be done by experts.

Again, in the stress of maintenance work on a large system it is frequently necessary that replacements of braking apparatus parts must be handled by men more or less unfamiliar with the details of such equipment. Unless the brakeshoe is properly placed and keyed, with the key driven through the lug instead of behind it, a shoe may drop off on the street at a critical moment. Special care is essential when such work is performed to give it close inspection from an experienced employee in the effort to avoid any complications resulting from improper adjustment of small though important parts.

In this connection there is room for improvement in many carhouses in the inspection of air compressors. Foremen often complain that it is necessary to take down a compressor in order to ascertain its condition, but where a considerable amount of compressor inspection is handled more can be learned by the sound of the compressor in operation than is generally realized. A defect in the crank shaft is announced by a decided thump; whereas a loose crank pin gives a positive click. In a recent case where 115 compressors were overhauled it was found that 91 of the equipments, or about 80 per cent, had broken connecting rods, or the rods were so badly worn that scrapping was necessary. Defective crank shafts were found in 25 and broken crank cases appeared in 8, the latter being caused by broken connecting rods. More thorough inspection would unquestionably have saved a considerable proportion of these failures. The failure of the check valves of a compressor to seat properly or the sticking of the governor may lead to serious results in service, due to continuous operation of the compressor pump. Few foremen realize the rapidity with which the temperature rises in a continuously running compressor. A recent test showed that the interior temperature rose to about 280 deg. Fahr. in one second after operation began, a final temperature of 440 deg. being reached in 75 minutes, at which point the check valves began to stick, necessitating a shut-down. A slight restriction of the flow of air may cause a temperature rise of several hundred degrees within a comparatively few seconds, and hence the importance of cleanliness cannot easily be overdrawn. Proper adjustment of the air gages is also a matter of consequence in connection with compressor maintenance and operation. Very few shops are equipped with a good instrument for gage calibration. A still more important part of the air brake maintenance department would be a triple-valve testing rack. Unfortunately, at the present time only the largest electric railways feel justified in purchasing this costly though accurate apparatus.

BUSINESS AND OFFICE CAR OF THE MICHIGAN UNITED RAILWAYS

The growth of the Michigan United Railways has been so substantial during the past two years and the mileage has been so greatly extended that it has been found advisable to provide a business or office car for the officials of this road. Through the courtesy of A. W. McLimont, vice-president and general manager, this paper is enabled to present the accompanying description and illustrations of the new business car, which has just been put into service. It should be borne in mind that this car is designed for operation over an interurban system exceeding 319 miles of track in extent and that sleeping and eating accommodations must, therefore, be provided. The car will serve as a traveling office for officers of the company. It is so designed that a view of the track may be had from commodious rooms at each end. The kitchen, buffet, heater and toilet rooms have been placed near the center of the car to make this observation feature conveniently possible.

The car is arranged for double-end operation and has two platforms 4 ft. 6 in. long. Steps are provided on one side of each platform and the motorman's cab is set off on the opposite side. The motorman has entrance to the general platform space by way of a swing door. The interior of the car body is subdivided into three general sections: An office and dining room at one end, 20 ft. long; a smoking room at the other end, 8 ft. 6 in. long, and a group of compartments, including the kitchen, buffet and toilet, near the center of the car, 11 ft. long. The general dimensions of the car body are as follows: Length over buffers, 51 ft.; length over body corner posts, 40 ft.; width over all, 8 ft. 10 in.; truck centers, 27 ft.; height, top of rail to top of running board, 12 ft. 4 in.

GENERAL INTERIOR ARRANGEMENT

The entire interior of the car, with the exception of the kitchen, buffet and toilet, is finished in African mahogany, the paneling being inlaid with tulip ebony and satinwood. The window posts are decorated with mahogany carvings.

All the metal trimmings throughout the car are polished bronze, with the exception of those in the toilet room, which are nickel-plated. The ceiling veneer is finished in Nile green and striped with gold. The tone of the ceiling harmonizes with the green carpet and the mahogany woodwork and furniture.

All the windows are provided with storm sash and weather strips. Each window has a curtain of green silk pantasote mounted on ring fixtures, and a decorative curtain of "sunfast" green silk velour drapes and valances hung on a brass rod. Pantasote curtains are placed on all doors so that the compartments of the car may be separated for sleeping rooms.

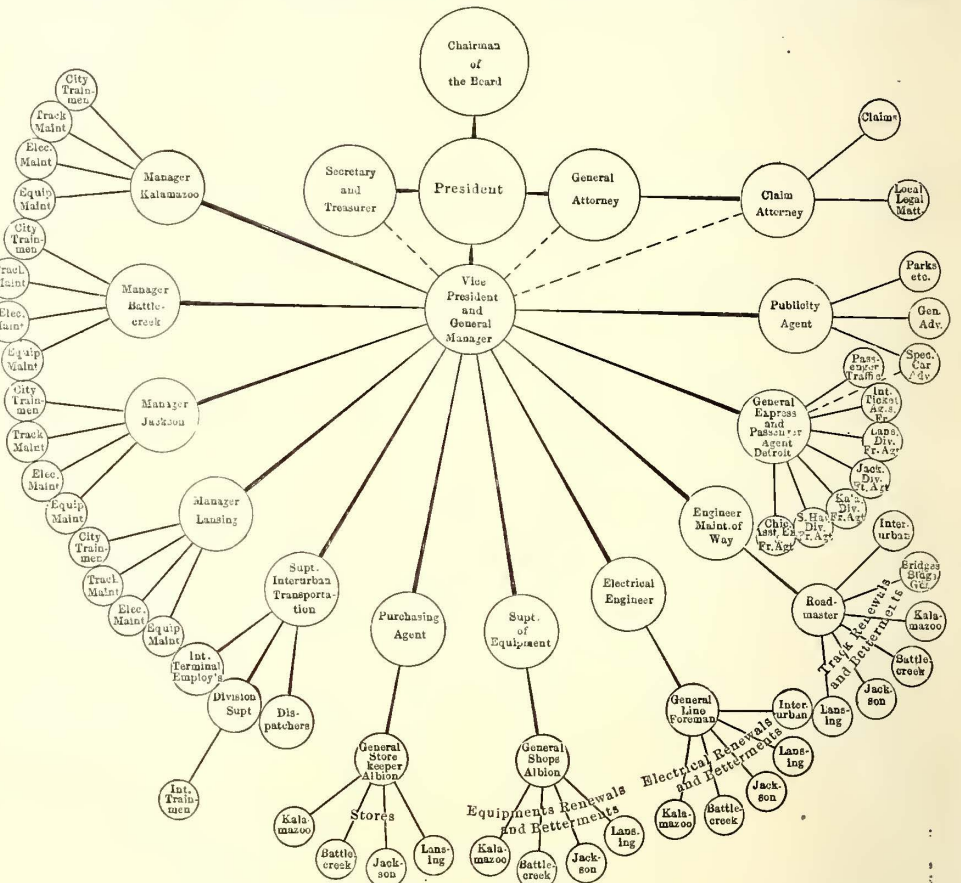
The movable furniture in the car includes a solid mahogany extension table in the dining room and ten mahogany chairs upholstered in green Spanish leather. The extension table is intended to serve as a dining table at meal time and as an office table, if it is needed, at other times. The fixed furniture of the car includes three sofa beds, each 6 ft. 2 in. long, upholstered in green Spanish leather. These beds have backs similar to the cushions and the two parts are hinged together so

that at night they may be arranged as full-sized beds. The space underneath the three sofa beds is utilized as lockers for storing steamer trunks, grips, etc. Removable brass rods are arranged on the ventilator rails to carry green silk curtains which inclose each bed.

Two especially designed desks have been built in this car, one at each end, against the section of the end bulkhead separating the motorman's compartment from the interior of the car body. These desks are about 6 ft. high and are provided with shelves for books and a folding leaf, including arrangements for storing a typewriter.

SMOKING COMPARTMENT

The smoking room at one end of the car is fitted with a folding desk for the manager's secretary, a portable typewriter stand for the stenographer and a pull-out sofa. This room is so arranged that it may conveniently serve as a traveling office and observation room. The windows on either side have been designed to provide an extensive view. The sash in the end



Michigan United Railways—Organization Chart

bulkheads and the vestibule are carried down to within 14 in. of the floor to increase the range of view. Two large windows in this compartment are each 5 ft. wide and one has been placed on either side. The pull-out sofa was built against the interior bulkhead, so that one may view the track from this position.

OFFICE AND DINING ROOM

The office and dining room at the end of the car opposite from the smoking room contains two of the sofa beds, the extension table and eight easy chairs. A 5-ft. mirror has been built into the partition next to the buffet. The arrangement of sash in the office and dining room end is similar to that of the smoking room end except that the side windows are not enlarged.

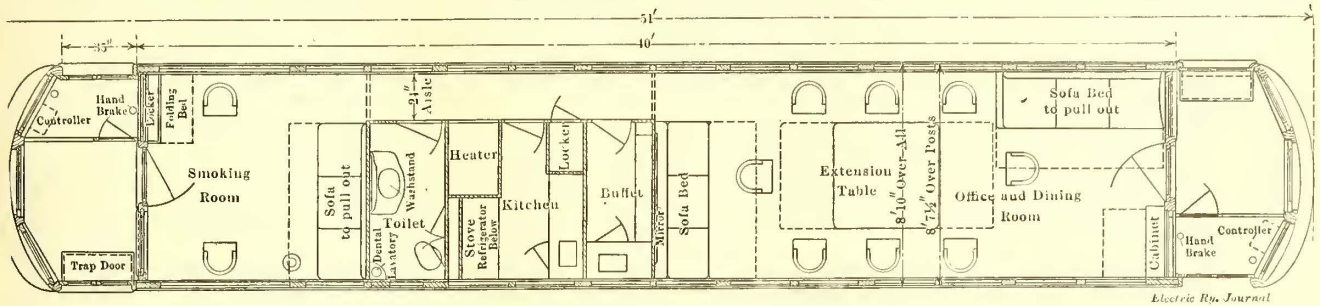
TOILET, KITCHEN, BUFFET AND HEATER ROOMS

The toilet room, kitchen and buffet, together with a heater compartment, occupy a portion of the car 11 ft. long x 6 ft. wide. An aisle 24 in. wide in the clear serves as a passageway past these compartments and between the smoking room and dining room. The group of small rooms is finished in ash and

stained mahogany. The toilet room is 6 ft. x 3 ft. in floor dimensions and is finished in white enamel, thus making it sanitary and light. It has a floor covering of linoleum. The window is oval-shaped and is fitted with a hinged sash similar to Pullman standard car construction. The interior fittings of this room include a Duner hopper, dental lavatory and wash-tand with hot and cold water with Watrouse fittings and open

been built in the corner of the kitchen and serves for the storage of a step-ladder, brooms, dust pans and miscellaneous utensils for the porter. This locker opens into the passageway.

The serving buffet between the kitchen and the dining room is 2 ft. 6 in. wide x 6 ft. long. It connects with the kitchen through a serving window, 18 in. x 30 in. in size, the upper half of which is closed by a sash filled with clear glass. This sash



Michigan United Railways—Plan of Business Car

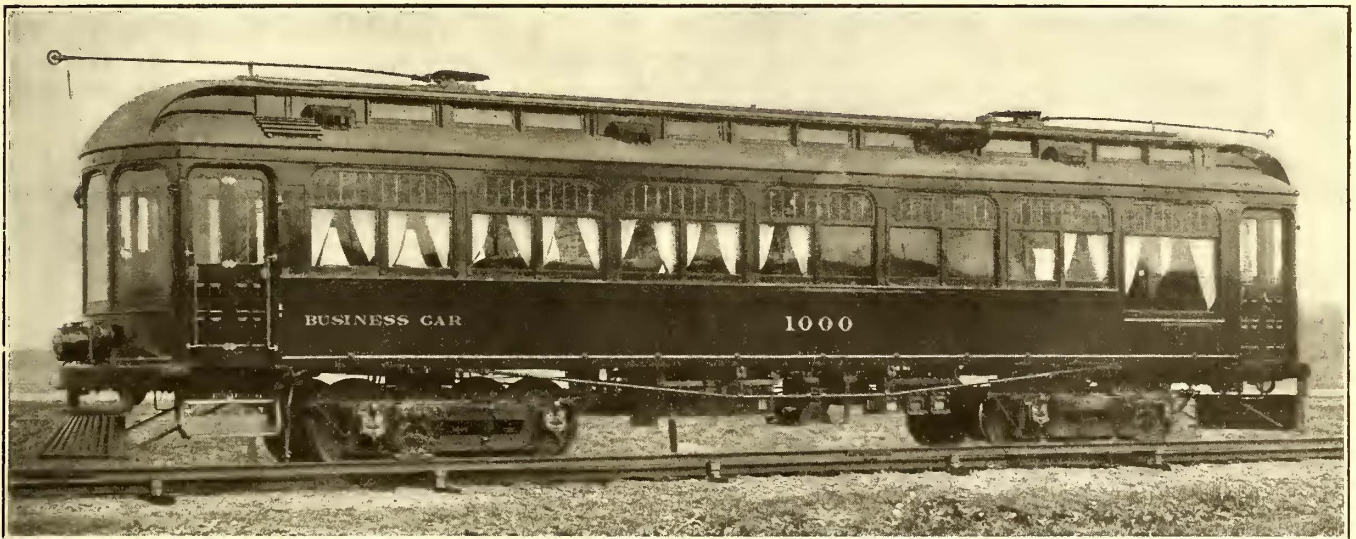
plumbing. The dental lavatory and washstand are made of polished white metal. A cabinet has been built into the partition wall and arranged for storage of toilet articles. Over the washstand is a plate-glate mirror 24 in. x 32 in. in size, having a pin tray beneath extending the full length of the mirror. The interior face of the toilet room door carries a plate-glass mirror, 14 in. x 60 in. in size, extending to within 8 in. of the floor. Hot water is supplied from the alcohol stove in the kitchen. All the trimmings in the toilet room are nickel-plated. The car heater compartment adjoins the toilet room. It is lined with galvanized iron and incloses a C-1 Peter Smith special car heater finished in nickel. Provision is made above the heater for storing fire extinguishers, markers, flags, torpedoes, etc., in especially built racks.

The kitchen and buffet are adjacent compartments connected by a service window. The kitchen equipment includes a McCray sanitary refrigerator finished in white enamel and an alcohol stove, which stands directly above the refrigerator. The filling point for the alcohol storage tank is located on the opposite side of the kitchen. The stove has two burners for frying, one burner for a coffee urn and one to heat the hot-water tank, which has a capacity of 5 gal. A warming oven is mounted

is arranged to swing so that large objects may be passed between the kitchen and the buffet. The furnishings in the buffet include two serving tables, one of which incloses a sink of the same size and design as that in the kitchen. Underneath the serving tables are storage lockers provided with sliding doors and locks. Above the serving tables on both sides of the buffet are rows of lockers with sliding doors and provision for storing dishes. A water cooler has been built on the buffet serving table. This cooler is 12 in. x 8 in. in section and 24 in. high. Two galvanized-iron tanks for water storage, supported by iron bands attached to the upper deck carlins, supply all of the water for the car.

BODY CONSTRUCTION

The car body of this interesting car is carried on an under-frame which includes four 6-in. I-beams and two channel sections reinforced by wooden stringers. Both platforms are covered with interlocking rubber tiling. The step openings in the platforms are covered with McGuire-Cummings steel trap-doors. Above each vestibule is a flat ceiling forming a compartment reached through doors opening into the interior of the car body. This compartment is utilized as storage space for bedding, camp stools, etc. The exterior of the car body has been



Michigan United Railways—Business Car Ready for Service

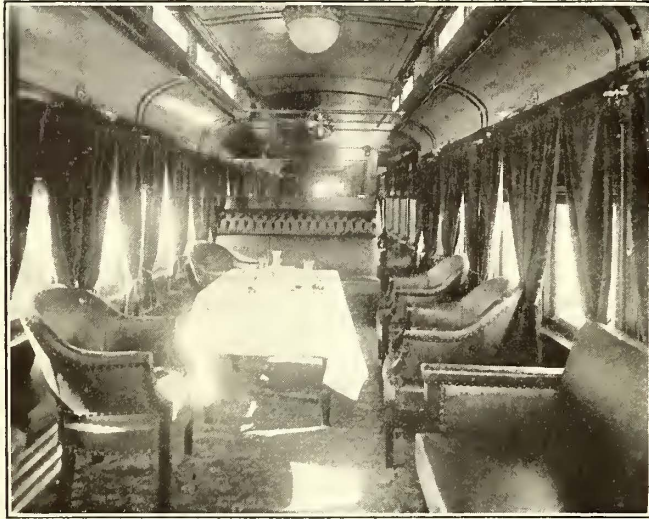
above the stove. This stove equipment was furnished by the Stearns Steel Range Company. On the side of the kitchen opposite the stove is a serving table, which includes a white enamel sink, 16 in. x 16 in. x 10 in. in size. The top of the serving table is covered with sheet brass. Above the sink are faucets for hot and cold water. Above and below the sink are lockers provided with sliding doors for storing cooking utensils. A locker about 16 in. x 20 in. in plan by 6 ft. high, has

finished in dark green, according to the Murphy Varnish Company's "A B C" system of application. The Gothics and oval windows are fitted with a brownish-tinted opalescent glass. Ventilation of the car is provided by eight Garland ventilators, so arranged as to afford ventilation in each of the sofa beds or berth sections, and in the toilet room and kitchen buffet.

LIGHTING SYSTEM

The interior lighting system is by storage battery only, there-

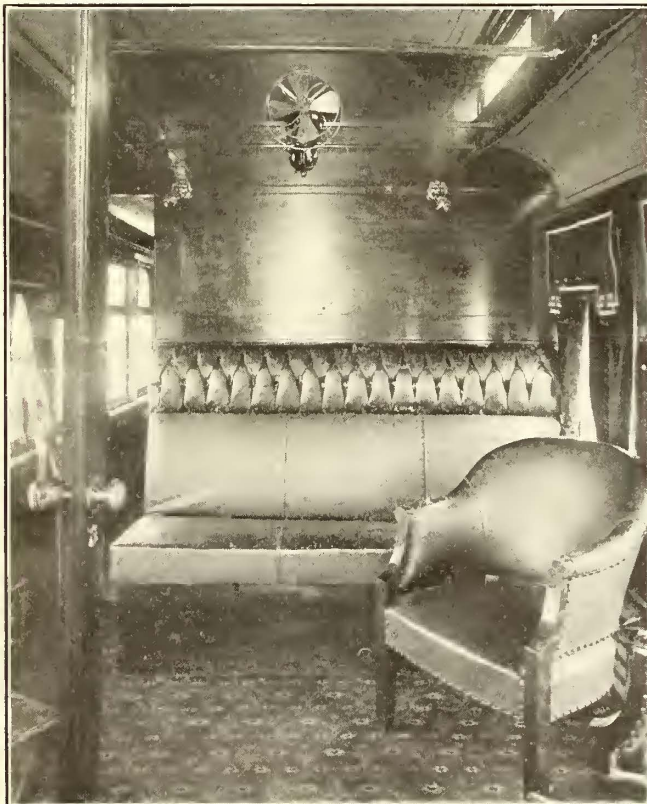
by doing away with possible interruptions due to trolley trouble and gaps in the third-rail at crossings. The storage battery is located beneath the car in such manner as to afford every facility for inspection and refilling. The battery is an Edison type A-4 with twenty-five cells of 150 amp-hour capacity, which



Michigan United Railways—Dining Room of Business Car

supply a 34-volt circuit. By means of a double-pole, double-throw switch the battery may be cut on charge or discharge. The charging current may be from trolley or third-rail through a resistance unit, also located beneath the car.

The lighting circuits are controlled from a lighting panel located in the kitchen. One circuit controls a five-light cluster



Michigan United Railways—Smoking Room of Car

in the dining room, another a three-light cluster in the smoker, a third controls the side lights in the dining room and a fourth the sidelights in the smoker, kitchen, buffet, toilet room and vestibule lights. Each individual light is provided with a socket switch. The vestibule lights are controlled by a two-way switch located in the motorman's cab. A separate switch

is provided for the fan circuit, which operates two 12-in. electric fans, one in the smoking room and the other in the dining room. Sockets are provided for individual lamps on each stenographer's desk. An annunciator system is provided to call attendants.

ELECTRICAL EQUIPMENT AND TRUCKS

The car is equipped with four GE-210 interpole motors and K-34-D controllers. U. S. 13 trolley bases and Allis-Chalmers A.A.-6 air compressors are used. The headlight is a General Electric luminous arc and is supplied either from trolley or third-rail. The car is equipped with railway company's third-rail appliances. The coupling equipment consists of M.C.B. radial couplers. Stanwood steps are used.

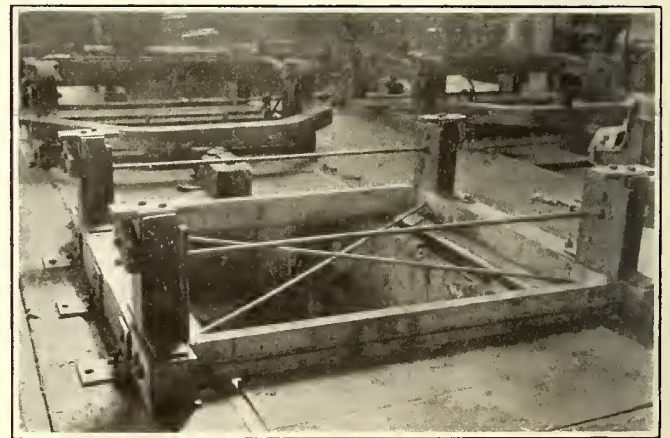
The body of the car is mounted on two pair of McGuire-Cummings standard No. 20-A M.C.B. type trucks with 37-in. Midvale rolled steel wheels and a wheelbase of 6 ft. 6 in. These wheels have a 3-in. tread and flanges 1 3/16 in. x 7/8 in. The axles have 5-in. x 9-in. M.C.B. journals. This car was designed and built by the McGuire-Cummings Manufacturing Company.

ORGANIZATION DIAGRAM

In connection with the description of the business car, it is appropriate to refer to the organization chart on page 738, which is designed to show the working and authoritative relations between the heads of departments and the higher officials of the Michigan United Railways. The lines connecting the different officers are slightly widened at the end toward which jurisdiction and authority are given; likewise, these lines narrow in the direction toward the superior officer to whom report is made. The dotted lines merely indicate that the men connected by them are to work together on some matters pertaining to their department without reporting directly to their superior. Besides the line indication of organization, the rings representing the different officials are gradually diminished as jurisdiction is diminished

JIG FOR TRUCK ASSEMBLY

The new repair shops of the Chicago Railways Company are now reconstructing the trucks on the 328 cars which are being rebuilt. Provision for speeding the truck work and assuring that the frames will be square has been made by building three assembly forms. As illustrated, these are made of heavy oak timbers reinforced with iron and bolted to the floor at the ends of the repair pits. In assembling a truck the side frame castings are first put on the assembly form and pulled up against



Jigs for Assembling Rebuilt Trucks

heavy iron plates, which give the correct location and spacing for the journal boxes. Next, the transom bars are placed between the frames and bolted in place. Then the angle-iron end bars are applied to the frame casting. The location of these bars is marked and the frame casting is chipped with air tools until the bars sit squarely.

ANNUAL CONVENTION OF IOWA ASSOCIATION

A very successful convention of the Iowa Street & Interurban Railway Association was held at Davenport, Ia., on April 20, 21 and 22. About fifty railroad representatives attended each of the sessions, which were presided over by the president, L. D. Mathes, general manager Union Electric Company, Dubuque. The manufacturers' representatives had a very attractive display of exhibits in the large Davenport Coliseum, where the sessions of the railway association and those of the Iowa Electrical Association were held. Through the courtesy of the local properties of Rock Island, Davenport and Moline, the convention guests were very generously entertained. On Friday, April 21, the members of the Iowa Street & Interurban Railway Association were guests of the Tri-City Railway Company on a special-car trip over the system in Rock Island, Moline and Davenport. A visit was made to the United States Arsenal on Rock Island, and the plans for the large new shop and carhouse facilities of the road were described and outlined on the trip. While at the repair shop in Davenport a demonstration of thermit welding was made. Next year's convention will be held at Des Moines.

PRESIDENT'S ADDRESS

The annual address of the president opened the proceedings of the association. This address is published elsewhere in this issue. Frank Hanlon, Mason City, then spoke a few words in appreciation of the valuable work which Mr. Mathes had rendered the association.

WOOD PRESERVATION

C. W. Rhoades, special sales agent St. Louis Surfacor & Paint Company, read a paper entitled "Wood Preservation." After a general review of the causes for decay, Mr. Rhoades took some specific instances to prove the economy of wood preservation. Thus, a pine tie costing 30 cents would last five years, but by treating it at an additional total cost of 30 cents the same tie could be made to last ten years. The cost of the untreated tie would be 30 cents plus 10 cents for putting it in the track, or 40 cents for five years' service, an average of 8 cents a year. The cost of ten years' service for the treated tie would be 60 cents, plus 10 cents for putting it in the track, or 70 cents, an average of 7 cents per year, to which must be added a yearly interest charge on the additional investment of 30 cents. At 4 per cent this charge would be 1.2 cents, or a total average yearly cost for the treated tie of 8.2 cents as against 8 cents for the untreated tie. Figured on this basis, 0.2 cent per tie per annum, or a yearly cost of \$5.60 to \$6 per mile of track, was the price paid to avoid disturbing the track substructure once in ten years.

The average life of untreated ties of all kinds was about six and one-half years, so that about 440 ties were removed from each mile of track each year. Assuming that chemical treatment would double the life of the ties, the use of this agency would reduce the annual number of removals by 220.

The cost of bar-tamping ties in general ballast, including digging out and filling in again, ranged from 2¼ cents to 6 cents each, according to wages and various conditions of the work, but the average of a number of carefully kept records was 3.7 cents. The advantage of reducing the number of tie renewals by 220 per mile per annum represented a saving of from \$8.14 to \$16.28 that would otherwise be expended in tamping new ties. This saving stood against the figures of \$6 or \$5.60 in the first paragraph, which represented the extra cost of treated over untreated ties. The actual economy might be even greater, as much track surfacing expense might be due to the settlement of overburdened old ties.

Figured on another basis a more favorable showing for the treated tie was possible. The annual interest charge at 4 per cent on the amount necessary to purchase the untreated tie and place it in the track (40 cents) is 1.6 cents; and an outlay of 7.4 cents at the end of each year, if invested in a sinking fund, was sufficient to replace the tie in the track at the end of five years. The annual cost of the untreated tie was

then 1.6 cents plus 7.4 cents = 9 cents. The annual charge on the cost of placing the treated tie in the track (70 cents) was 2.8 cents, and the annual outlay toward the sinking fund sufficient to replace the tie in the track at the expiration of ten years was 5.8 cents. The annual cost of the treated tie was thus 2.8 cents plus 5.8 cents = 8.6 cents, or 0.4 cents in favor of the treated tie.

A less favorable showing was made for the treated tie when figured on the basis of higher first cost of tie, higher rate of interest or longer life for the untreated tie. In general the economy was greater the shorter the life of the untreated tie.

After reading his paper Mr. Rhoades said that the statistics contained therein had been made up largely from data presented before the American Railway Engineering & Maintenance of Way Association. He described a method of applying carbolineum having a boiling point of 590 deg. The supply of carbolineum was held in a tank and heated with steam coils. Wood to be treated was immersed in the carbolineum, which was kept at a temperature higher than the boiling point of the water, and thus the sap was boiled out, and its place in the wood structure was filled by carbolineum. Mr. Rhoades had seen ties that had been treated in this manner for five minutes, which were found to have been completely penetrated by the carbolineum. The company which Mr. Rhoades represented sold Barol carbolineum, the word "Barol" meaning that the material contained elements which afforded the antiseptic qualities of copper.

Mr. Rhoades stated that one of the most important things in connection with wood preservatives was the method of application. For instance, it had been shown that if only the bottom of a pole was treated with a preservative then the closed wood pores served to hold the moisture which drained downward from the upper unprotected parts. For that reason he advocated cutting 1 in. off the bottom of a pole after it had been treated to permit the moisture to leave the heart. Also it was advisable to make the bottom of a pole wedge-shaped and thus assist drainage.

P. P. Crafts, Davenport, stated that last year the Illinois & Iowa Railway had replaced 20,000 ties. The labor cost for inserting these ties in stone ballast was about 16 cents each, and the work had been scattered from one end of the road to the other. He called attention to the demand on the part of steam railroads for more and more hardwood ties. These were required on account of increased rail wear with heavier equipments.

Mr. Rhoades spoke of the great variation in the life of different woods in different parts of the country, citing, as an example, cypress wood, which lasted but a short time in the North, but if kept in wet ground in the South would last almost indefinitely. He also said that one of the objects of wood preservation was to bring the life of the wood up to the mechanical life of the tie.

Day Oakes, chief engineer Kettle River Quarries Company, Minneapolis, Minn., presented a paper entitled "Preservative Treatments for Railway Ties." He first summarized the main features of the principal wood preservation methods and the results obtained with them by steam railroads. He said that the plant cost of the various treatments figured on the basis of the use of a standard-size cross tie would be for ½ lb. of zinc per cu. ft., 16 cents; for full-cell creosote treatment, using 6.2-3 lb. of oil per cu. ft., 28½ cents, and with 8½ lb. of oil, 31 cents; for the empty coil treatments, using 4 lb. to 6 lb. of oil per tie, the cost would be approximately 31 cents; for the zinc creosote or card process, the cost would be about 24 cents per tie. Mr. Oakes also submitted three tables to show the economy of the use of the various treatments based on the cost of untreated white oak ties at 65 cents and untreated inferior timber ties such as red oak, gum, etc., at 45 cents. These figures naturally varied with the timber and treatment market, but the relation of their cost remained practically fixed, so that the comparative results shown in the tables would generally prevail. The life assumed for the untreated white oak tie was the average shown by extended experience.

The first table showed how long ties of different materials and treatment must last in order to be as economical as white oak costing 65 cents and lasting eight years. The resultant necessary life of treated ties for economical use as worked out in this table was below the minimum shown by experience. In his second table, which was based on an assumed life indicated by experience, Mr. Oakes figured the first cost which

should be obtained. Mr. Mathes said that these ties had been in about five years and had not required any renewals, while similar ties in macadam ballast laid at the same time had been renewed to the extent of 5 per cent.

DEVELOPMENT OF AUXILIARY LOAD.

A paper on "Development of the Auxiliary Load for Railway Power Plants" was read by J. C. Young, contracting

COST DELIVERED WHICH A WHITE OAK TIE, LASTING EIGHT YEARS, MUST REACH BEFORE IT WILL BE ECONOMICAL TO USE THE TREATED TIE HEAD-ING THE RESPECTIVE COLUMN OF THE TABLE.

Letter of Formula.	Description.	Interior Woods			No Tie Plate.			Interior Woods with Tie Plate.		
		White Oak Untreated.	Zinc Chloride.	Card Process.	1 1/2 Gal. Creosote.	2 Gal. Creosote.	2 1/2 Gal. Creosote.	Zinc Chloride.	Card Process.	2 1/2 Gal. Creosote.
i	Assumed life of tie in years.....	8	12	14	14	18	20	18	24	30
i	Assumed rate of interest.....	4	4	4	4	4	4	4	4	4
s	Annuity to redeem \$1 during life of tie.....	.1085	.0665	.0547	.0547	.0390	.0336	.0390	.0259	.0178
	Spacing of ties c to c in feet.....	1.833	1.833	1.833	1.833	1.833	1.833	1.833	1.833	1.833
	Assumed cost of tie delivered.....	.65	.45	.45	.45	.45	.45	.45	.45	.45
	Cost of treating tie.....	.16	.24	.25	.25	.285	.285	.16	.24	.31
	Cost of putting in tie.....	.12	.12	.12	.12	.12	.12	.12	.12	.12
	Cost of 4 track spikes.....	.064	.064	.064	.064	.064	.064	.064	.064	.064
	Cost of 4 wood screws.....	.15	.15	.15	.15	.15	.15	.15	.15	.15
	Cost of 4 helical linings.....	.03	.03	.03	.03	.03	.03	.03	.03	.03
	Cost of 2 tie plates.....	.32	.32	.32	.32	.32	.32	.32	.32	.32
	Cost of application of fastenings.....	.12	.12	.12	.12	.12	.12	.12	.12	.12
	Total cost of tie in track.....	.864	.824	.904	.914	.949	.974	1.35	1.43	1.50
c	Cost of tie per lin. ft. of track.....	.471	.449	.493	.498	.517	.531	.736	.780	.818
	Annual cost of tie per lin. ft. of track.....	.0698	.0478	.0466	.0471	.0408	.0391	.0581	.0514	.0472
	Annual cost of tie per mile of track.....	\$369	252	246	249	216	206	306	271	249
c ¹	Cost delivered which a white oak must reach before it will be economical to use tie at head of column.	.381	.360	.368	.290	.269	.505	.420	.369	
	Formula	$c = \frac{x}{i \text{ plus } s}$			$c^1 = c \times 1.833 - 21.4$					

could be paid for different kinds of ties in order to be as economical as white oak costing 65 cents and lasting eight years. The third table, which is the only one reproduced, is a readjustment of the other two. It shows the cost which a white oak tie must reach before it will be economical to use the various treated ties at their assumed life and cost, and also the charge per mile of track for ties of the various treatments.

Mr. Oakes said that his company advocated the application of preservative compounds by pressure treatment. A plant for doing this work was located at Madison, Ill. It was a question whether the compound to be applied should be heated by live steam or by steam in coils of pipe. His preference was for the latter method, because the temperature could be controlled better, and because there was no possibility for the steam to weaken the wood fibers. In the pressure treatment the moisture was driven out of the wood by the hot oil, and then a pressure of about 120 lb. per square inch was applied to drive the oil into the wood.

Mr. Rhoades stated that the action of the sun tended to draw creosote out of a tie in contrast with its tendency to drive carbolineum into the wood; also, that creosoted ties sometimes were not used on steam railroad curves because the wood was greasy and the spikes did not hold so well in them.

In reply to Mr. Hanlon Mr. Oakes said that the use of a preservative on cedar ties was not recommended because of their low first cost and low mechanical resistance to wear. J. F. Porter, Davenport, called attention to the equality in price of untreated white oak ties and zinc-treated red oak ties. The mechanical lives of the two were practically the same.

Mr. Crafts said that the 20,000 ties installed last year cost about 61 cents each. The lot was made up of three-fourths standard No. 1 ties and one-fourth 5-in. face ties. From nine to ten years' life could be obtained from them under normal traffic conditions. They had not been treated.

Mr. Hanlon had cedar ties that had been in service fourteen years. His road handled freight to the amount of 25 to 75 cars daily and used 40-ton motor cars. These ties were the 7-ft. trolley size and still were in good condition after fourteen years' service.

Mr. Mathes said the Union Electric Company had about 10 miles of track laid with 6-in. x 8-in. x 8-ft. ties embedded in concrete and covered with brick pavement. The traffic was light, and ties had been carefully selected. He was desirous of knowing what life should be expected from them. Mr. Oakes said the life depended greatly on the drainage, but fifteen years or more

agent Cedar Rapids & Iowa City Railway & Light Company. This paper will be found on page 746. Mr. Mathes noted that the general trend now was for electric railways to increase their revenue in every possible way, and for this reason many roads had undertaken to sell power from the trolley wires or transmission line.

Mr. Crafts said that the Iowa & Illinois Railway a few years ago undertook the sale of power. The tendency then was to sell 500-volt current from the trolley wire and to have the purchaser build his line to the right-of-way fence, where protective devices were installed. Mr. Crafts criticised this plan because the expense for fuses, burned meters and upkeep overbalanced the profits from the sale of the current. He now had two d.c. motor customers, one with a 5-hp motor and the other with a 50-hp motor. The former installation was located near a carhouse and the latter near a substation, so the cost for attendance to the customer's service line and connection was not unduly large. At Princeton this company was furnishing energy for a circuit of 360-volt, 40-watt series tungsten street lamps. Another installation just had been made at a large country residence. Energy here was furnished for 40 hp of motor capacity and 500 lamps, all operated by alternating current transmitted at 2200 volts. The supply was taken from the secondary side of the substation transformers at 360 volts and stepped up for transmission. Energy was sold at the rates established by the large lighting company in Davenport. Mr. Crafts doubted the advisability of connecting a large number of power customers direct to the trolley line because railroad service might thus be hampered. On the other hand, however, if the power load was large enough a maintenance man might be employed and thus the possibility of interference be greatly reduced.

Frank McDonald, Waterloo, stated that the Waterloo, Cedar Falls & Northern, when first started, had some d.c. power customers, but that the business was not profitable, and so was turned over to the local lighting and power company. To-day, however, the road was considering the sale of energy along its interurban line to those towns in which substations are located.

Charles Munson, electrical engineer Cedar Rapids & Iowa City Railway & Light Company, said that the supply of d.c. power to customers by his road had not caused any line troubles. Heavy fuses were put at the line connection close to the lightning arresters, and light fuses, which could be replaced by the customer, were placed at the motors.

Mr. Mathes told of some power supply furnished from a suburban trolley line extending to the company's railway

park. One customer was a dairy establishment using a 10-hp motor to operate a machine for milking cows. The revenue from this customer averaged from \$35 to \$40 a month. Other customers on the trolley line had installed 5-hp motors for sawing wood. The gross revenue from the sale of energy along this suburban trolley line was about \$900 a year, and regular city rates were charged.

SHOP PRACTICES

A paper on "Things Worth While in Shop Practice," by Jacob Gerke, master mechanic Tri-City Railway Company, Davenport, was read by J. G. Huntoon, superintendent of the same property. An abstract of this paper will be found on page 745.

The discussion was opened by C. M. Feist, master mechanic Sioux City Service Company, who described his methods for testing motor coils and for removing wheels by the use of a special pit jack. Mr. Feist had not obtained very good results from impregnated field coils. At one time he purchased sixteen and found five to be imperfect. Other members spoke of having had coils impregnated, and were not highly enthusiastic regarding their succeeding life. Mr. Feist had obtained excellent results from 300 coils wound with Heney fireproof wire. The first cost of these coils was high, but results justified it. He also stated that the installation of automotoneers on sixty cars had very greatly reduced commutator and brush troubles. Formerly 7,000 brushes were used per year, but since the automotoneers have been used but 500 brushes a year are required. Mr. Feist thought that the application of trip wattmeters or coasting clocks to cars would soon bring about an economy. In this connection Mr. Mathes said that a small road might well afford to give premiums of \$50 every three months to the motormen having the best car power record.

CAST-IRON WHEELS

Mr. Feist then described his wheel practice, calling attention to the high mileages obtained as a result of careful attention and the use of a wheel grinder. The average life of cast-iron wheels on the Sioux City property, as determined for a period of six years, was 97,000 miles for 30-in. wheels and 137,000 miles for 33-in. wheels. These records were obtained only by careful watching for wheel troubles and the removal of the causes. One factor in shortening the life of wheels was the hard-center special work. To improve this condition Mr. Feist had built a special grinder for enlarging the throats of the special work layouts. The grinder was mounted on a 4-ft. truck, and had a 3-hp motor which drove an emery wheel that was $1\frac{1}{4}$ in. thick. Three men did the grinding work, going over the special work about once each year. Mr. Feist said that the cast-iron wheels used in Sioux City had about $\frac{7}{8}$ -in. chill, and were worn down about 1 in. in diameter before scrapping. All new wheels were ground before being put under a car, and thus assurance was had that they were round and of the same size. The grinding machine used had two grinding wheels driven by a 10-hp motor. The grinder cost \$1,600 in place.

Mr. Mathes described a Pittsburgh car hoist installed in his shops. This hoist had done very effective work and had cost \$600 at the factory. A representative of the La Crosse (Wis.) City Railway Company stated that his company obtained a mileage of about 55,000 miles for cast-iron wheels. Mr. McDonald said that the shop force at Waterloo had made a boom crane from the trucks of an old freight car, and that it was very useful in handling heavy parts around the shop.

At the conclusion of the session President Mathes read a telegram of greeting from J. R. Harrigan, the new executive of the Des Moines Railway property. Mr. Mathes also spoke of the early history of the Iowa Street & Interurban Railway Association, calling attention particularly to the important part which Mr. G. B. Hippee, the retiring president of the Des Moines City Railway and manager of the Des Moines Inter-Urban Railway, had taken in the early work. After this review of the history of the association during its nine years of existence, the association unanimously voted Mr. Hippee

to honorary life membership and instructed a committee to prepare and transmit resolutions of appreciation of Mr. Hippee's work in behalf of the electric railway industry.

HANDLING SNOWSTORMS

The first paper of the morning session of the second day was read by Frank S. Cummins, traffic manager the Inter-Urban Railway, Des Moines. This paper, entitled "Effective Method of Handling Snowstorms," will be found in abstract on page 747.

Mr. Huntoon said that the Tri-City Railway used six sweepers and one nose plow for handling the snow on 90 miles of track. Ordinarily the sweepers were sent out when the snow was about 1 in. deep, but it was hard to tell how to attack the snow problem except as experience had determined. It had been fifteen years since the Tri-City Railway had been tied up on account of snow. The practice was to use as small an amount of salt as possible on street tracks, because it formed a gum on the rails and made them slippery. All grades and curves, however, were salted and sanded. Each of the company's cars was provided with track scrapers at both ends, and these scrapers would care for 3 in. or 4 in. of snow.

C. D. Jones, president Marshalltown Light, Power & Railway Company, described the use of extension boards for clearing the streets near the tracks and called attention to the excellent snow-fighting service obtained from old motors as compared with later types.

L. C. Nash said that the Omaha & Council Bluffs Street Railway Company had twelve sweepers to care for about 140 miles of track. His experience had been that economy in snow-fighting equipment usually resulted in blockades. It was not advisable for the snow-fighting equipment to include or be driven by any but the best mechanisms obtainable. His company supplied the crews on the snow-fighting equipment with hot coffee and sandwiches.

Frank Hanlon had not found that salt made the rails slippery; rather the contrary. In handling freight after a storm the use of salt made it possible to pull a train of cars with a motor which, without salt on the tracks, could hardly move itself. He had found that ordinary storms did not interfere with operation if all the passenger cars were equipped with small plows. He was seeking for some device which would keep the flangeways clear. He had had trouble with the ridge of snow forming between the rails and had purchased an ice leveler, but had not yet had an opportunity to give it a thorough trial. For protection in the country dependence was put on snow fencing.

Mr. Crafts described a home-made snow plow that had been built from a 22-ft. flat car. The shear under the center of this car first was operated by a hand lifting screw. This year an air cylinder had been applied to raise and lower it, and considerable time was saved when the car was passing crossings. The snow plow was handled by an express car and usually was run over the road first to get car clearance and a second time to clean the track. He expected to equip the snow plow with an air-operated flanging outfit. Mr. Mathes spoke of the attitude of the public where a road was endeavoring to keep its tracks open during a storm. He planned to buy a new sweeper and build a salt car. He thought that a good sweeper with wings was more effective for street work than a plow.

B. Bohnsen, superintendent Clinton Street Railway, said his company had one plow for 14 miles of track. Last winter they had used but little salt, but the previous year one storm had required \$40 worth. He found that salt made the track greasy.

Mr. Nash said that the Omaha company frequently salted one rail and sanded the other. A great deal of the track was in streets paved with asphalt, and the track space was paved with granite. Thus in a heavy snowstorm the asphalt became slippery, and the only good path for teams was in the cleaned track. The teams turning in and out of the track would keep the rail covered with snow. Unless salt were used, it might often be necessary to get out the sweepers.

Several members spoke of using horse-drawn drags for smoothing down the ridges of snow alongside the tracks.

AMERICAN ASSOCIATION AFFAIRS

Mr. Mathes read a letter from Arthur W. Brady, president American Electric Railway Association, complimenting the Iowa association on its standing in the field and expressing his regret and that of H. C. Donecker, secretary of the American association, at their inability to attend the Davenport meeting. Next a general discussion was had on the probable location of the annual convention of the American association. This discussion resulted in a unanimous vote of the Iowa association in favor of Chicago as the next convention city for the American association.

STEEL WHEELS

J. C. Holding, Carnegie Steel Company, presented a paper on "Solid Steel Wheels." The solid steel wheel was superior to the steel-tired and cast-iron wheels from the standpoints of strength, safety and durability. He said that a steel wheel might be treated as a single-life wheel, but as a rule this was not advisable as in most cases the contour of tread and flange would be so greatly impaired before the available wearing body had been used that it would be unsafe to continue it in service but at the same time positively wasteful to scrap it while sufficient metal remained to obtain further wear if the contour were restored to its normal condition. The usual procedure, therefore, was to continue the wheel in service for a certain period, then remove it, place it in a lathe and restore the contour to its original form by turning. Actual results obtained by giving careful attention to the contour and experimenting with regard to the critical point at which to withdraw wheels for turning seemed to have established the amounts of wear and turning consistent with the best and most uniform condition of the contour as $\frac{3}{8}$ -in. wear, $\frac{1}{4}$ -in. turning; $\frac{3}{8}$ -in. wear, $\frac{1}{4}$ -in. turning, and so on until the available metal in the rim has been used up. By this practice a rim $2\frac{1}{2}$ in. thick, which must be discarded according to the M. C. B. rules when not less than $\frac{3}{4}$ in. thick, would give three periods of wear, each reducing the rim by $\frac{3}{8}$ in. and followed by a restoration of contour by turning $\frac{1}{4}$ in. The same procedure as to turning could be followed in street and interurban practice, but each case demanded careful study.

The allowable drop of the car due to reduction of wheel diameter was the determining factor in fixing the thickness of rim and consequent durability and economy of the wheel. For example, a road using a 33-in. cast-iron wheel would probably not be able to obtain an economical life from a steel wheel of the same diameter, because however thick the rim might be when new it would probably not be worn down to the minimum safe thickness, for by so doing the diameter of the wheel would be so reduced that there would not be sufficient clearance between the gear cases or motors and the pavement. For instance, if the allowable drop of a car mounted on trucks with 33-in. wheels were $1\frac{1}{2}$ in. it would be useless to provide 33-in. wheels with $2\frac{1}{2}$ -in. rim thickness, as only $1\frac{1}{2}$ in. of this metal could be utilized and the remaining life of the wheel would be wasted. In such a case, therefore, it was advisable, if possible, to use a 34-in. wheel when new in order to get the additional clearance above the street level and so permit the entire wearing body of the wheel to be used. Where city and interurban cars are operated by the same company it was a common practice to order large diameter wheels with thick rims. These wheels then were used under interurban cars until reduced to the minimum diameter for interurban service, whereupon they were applied to the city equipment.

Mr. Holding said it was a little difficult to give mileage records of steel wheels in city service on account of their comparatively recent introduction into that field, but, among the records obtainable, those furnished by the Brooklyn Rapid Transit Company were fair samples. On Dec. 18, 1908, the Brooklyn company reported an average of 33,510 miles per wheel for 504 wheels turned once and an average of 58,761 miles for 256 wheels turned twice. It also reported for the same date that it had 414 wheels which had never been turned

but which had given an average mileage of 71,471 miles per wheel. This variation in the mileage obtained per wheel might be due to local conditions on the individual lines, such as differences in the number of stops.

The solid steel wheel, Mr. Holding said, had not only been widely adopted for city service, but it was also coming to be recognized as the standard for high-speed interurban railways. The Metropolitan Street Railway, Kansas City, Mo., had obtained some remarkable mileage records and submitted one of 247,200 miles for one pair of wheels. The wheels were turned twice during their life to restore contours. Several of the leading elevated and subway roads in the United States had used steel wheels practically since their introduction. The Boston Elevated Railway and the Interborough Rapid Transit Company, of New York, were both users of steel wheels. The latter company had obtained very satisfactory results and had allowed one of the manufacturers to exhibit a pair which had run 60,400 miles with a tread wear of only $\frac{5}{16}$ in., or an average of 12,080 miles per $\frac{1}{16}$ in. of metal worn off. All of the foregoing facts led to the conclusion that solid steel wheels were the most economical in the end.

Mr. Holding said that the one difficulty with which manufacturers of steel wheels have had to contend was the multiplicity of designs called for by users. The adaptation of steel to the peculiarities of design frequently insisted upon was not so easy as in the case of cast iron, as the process of forging or rolling a mass of steel was not so simple as that of pouring the molten metal into a mold made from a wooden pattern. Therefore, one of the first things that had to be done in introducing steel wheels was to standardize as much as possible the designs for various classes of service. The Carnegie Steel Company gave this feature very careful consideration and finally settled upon twenty-one designs which it proposed to manufacture as its standard output. Of these, three were for engine trucks, two for tenders, two for passenger train cars, two for freight cars, two for electric street cars, eight for electric interurban cars and two for electric subway and elevated cars. The ten designs embodied in the 1910 report of the American Electric Railway Engineering Association conformed in all respects to ten Carnegie designs for the same service.

The manufacturers had been greatly assisted in the campaign for standardization by the action of the various railway associations, such as the Master Car Builders' Association, American Railway Master Mechanics' Association and the American Electric Railway Association, all of which had recognized the solid steel wheel as an important and growing factor in their respective fields and had adopted certain standard practices in connection with its use. In concluding his paper, Mr. Holding described the making of a solid steel wheel.

Several members spoke of their experience with steel wheels. Mr. Hanlon had three double-truck cars equipped with solid wheels and twelve with steel-tired wheels. These had not been in service long enough to determine the wheel mileage.

The solid steel wheels under two 40-ton interurbans had been run for one year and had just received their first turning. One pair of wheels had been unsatisfactory from the start. His cars were operated single-ended, and the principal wear occurred on the wheels of the leading trucks. He planned to increase the use of steel wheels.

Mr. Crafts had used steel-tired wheels on the Iowa & Illinois Railway for seven years. The service had been very satisfactory. Cars weighing 37 tons were operated at 60 m.p.h. The steel tires were held on with retaining rings, and at first some trouble was experienced with well-worn tires becoming loose. Later the size of the centers had been increased and this trouble obviated. He had found the wear to be about 9000 or 10,000 miles per 1-16 in. reduction in diameter. The principal cause of undue wear was the city girder rails and special track work. Tires were sent to a local machine shop for re-turning at a cost of about \$6.

F. O. Grayson, St. Louis Car Wheel Company, said that the depth of the chill on cast-iron wheels was about $\frac{7}{8}$ in. Mr.

Grayson also called attention to the high scrap value of iron wheels as compared with steel wheels. He said that one cause for undue shopping of steel wheels was the inability of roads to mate wheels on axles according to their degree of hardness and their size; also, that after a steel wheel had been slid flat, even though the flat spot did roll out, the character of the metal was so changed that it was difficult to re-turn the tire without considerable waste.

Mr. Friday said that the Chicago City Railway was grinding its steel wheels where necessary to reduce the diameter and thus reverse flange wear. Mr. Mathes asked Mr. Friday for the relative brakeshoe wear with steel and cast-iron wheels. It was stated to be from 8 per cent to 10 per cent in favor of cast-iron wheels.

Mr. Mathes some years ago had purchased steel-tired wheels for cars operating on a line that had 12 per cent grades. The original cost of these wheels had been about four times that for iron wheels, however; the steel-tired wheels had never developed flat spots, and had worn out without turning.

T. Woods, master mechanic of the Omaha & Council Bluffs Street Railway, described the wheel practice of his company, which showed a wheel life up to 80,000 miles before the first turning. Special care was taken to reverse the trucks whenever the flange wear became unbalanced. It cost about \$2 to reverse the trucks and obtain even flange wear. Mr. Woods said he had a few double-end cars on which cast-iron wheels had run 100,000 miles. During the last two years, however, on account of new special work and a large number of new motormen, the average service from cast-iron wheels had been about 35,000 miles. Mr. Mathes said for his property, including the hill line, the iron wheels had an average life of 50,000 miles on the single-truck cars. The average speed of operation for the entire road was 7.8 m.p.h.

NEW OFFICERS

The association held an executive session on the last day of its convention and elected the following officers for the coming year: President, L. D. Mathes, general manager Union Electric Company, Dubuque; vice-president, C. D. Cass, general manager Waterloo, Cedar Falls & Northern Railway Company; secretary, H. E. Weeks, secretary and treasurer Tri-City Railway Company, Davenport.

THINGS WORTH WHILE IN SHOP PRACTICE *

BY JACOB GERKE, MASTER MECHANIC TRI-CITY RAILWAY, DAVENPORT.

The most important special labor-saving device in our shops is a field tester. The prime defect in all field trouble is caused by baking and moisture, and unfortunately, a field damaged by moisture shows no evidence of deterioration on the outside. Even when stripped to the cotton-covered wire it looks white and new, but a test will undoubtedly disclose a bad short-circuit somewhere in the coil. Another advantage of the tester is that the field can be tested while in the motor. This is important because the turns of stiff wire are apt to spring apart when the field clamping plates are loosened, and some classes of defect apparently disappear.

We have installed an emery-wheel commutator slotter, and only 15 to 20 minutes are required to slot any of the commutators used on our system. Another very useful outfit in our repair shop is a reheating fixture for tightening loose controller cylinder sections on the shafts. With this device and the compound, furnished by one of the large electrical companies, we have eliminated 50 per cent of controller defects. Up to a few years ago we used to remove and replace car wheels by jacking the body from the trucks. This required a great deal of time and extra help. We have a wheel lift in our shop—a pit with a 40-in. section of rail to be removed after the car is in position. The body is supported by two jacks and a tripod and chain blocks are placed on the inside of the car to hold the motor, after which we raise a 3-in. screw lift, operated by

one man, until it reaches the center of the axle between motor axle bearings. We then remove these and the lower half of the gear case, then the wheels are ready to be lowered into the pit. We can remove and replace a set of wheels in an hour. Heretofore this work required from five to six hours.

In 1904 the company built thirty-eight double-truck closed cars with stationary side windows. This made a very good type of car during the cold winter months, but at the change of the season it was necessary to remove the windows and store them away in boxes. This caused much inconvenience and expense and furthermore made the cars uncomfortably cold on rainy days in the late spring and early fall. During the past few years we have remodeled these thirty-eight cars to semi-convertibles and have increased the aisle space by remodeling the seats. In the course of this reconstruction we changed the cables from the outside to the inside of the car and placed them in conduits. We also put the air pipes at the center and placed the air intakes for the compressors under the seats, a location which we have found to be more free from dust than any other part of the car. By these changes we have eliminated a great deal of trouble and delays in schedule due to grounded cables caused by the splashing of water and wheels cutting them in derailments.

The inhalation of dust by workmen when working over dust-covered motors has been obviated to some extent in our shop by the placing of a blower and pipes to draw away the dust and discharge it into the open air.

Another labor-saving tool which has proved very desirable in our shop is an air drill. It was used during the reconstruction of our cars for drilling the holes through the timbers and iron while under the cars, so that these parts did not have to be taken to a drill press. It was also used for redrilling the motor lead holes from the suspension side of the casings to the axle side. This avoids dismantling the motors.

We have also found a welding outfit very useful for repairing broken castings and especially broken motor castings. With this outfit the first step taken in the work of repairs is to clean the parts to be welded and clamp them in position. If the metal is very thick at the fracture a space from $\frac{1}{2}$ in. to $\frac{3}{4}$ in. should be cut out before clamping. In case the part to be welded is a lug, it is a very simple matter to clamp it in position simply by bolting it to an angle-iron bar which is bent to the size. The next step is to adjust a collar of beeswax around the fracture. This should be from 2 in. to 3 in. wide and $\frac{3}{4}$ in. thick. Then an iron mold is placed in position to allow for a clearance of about 3 in. on either side of the collar. Next a small block is used for a narrow gate and another for a riser. We then leave a small hole at the bottom of the mold so that when the wax is heated it can run out. Next we put into the mold about 40 per cent of fireclay and 60 per cent of clean, sharp sand mixed dry and then moistened enough to dampen well. The mold is then thoroughly vented and the blocks for the gate and risers withdrawn. We then use a blow-torch in the hole at the bottom to heat until the wax has run out and the parts to be welded have been brought up to a cherry heat, after which we plug up the hole with dry sand to prevent leakage. We are then ready to make the charge with the necessary steel, powder, etc., from the crucible. For every pound of wax used we multiply by 32 to ascertain the amount of material which will be necessary to fill the mold.

In the Rock Island shop the company has the necessary machinery for building cars and office fixtures. During the past few years it has repaired several large interurban cars for one of the nearby railway companies. Our company has plans under way for a new, complete and modern car shop to be erected east of our present building, the larger portion of the roof to be of glass to minimize artificial light. Depressed floors between tracks at the overhauling pit are provided so that the work may be done on the sides of the trucks to better advantage. The company also intends to install modern types of machinery, such as electric traveling cranes, air hoists, wheel truing, pipe-bending and sand-papering machines.

*Abstract of paper read at the annual meeting of the Iowa Street & Interurban Railway Association, Davenport, Ia., April 20-22, 1911.

DEVELOPMENT OF THE AUXILIARY LOAD FOR RAILWAY POWER PLANTS*

BY J. C. YOUNG, CONTRACTING AGENT CEDAR RAPIDS & IOWA CITY RAILWAY & LIGHT COMPANY

The possibilities for revenue from the distribution system of an electric railway can be divided into two classes—that from the a.c. lines and that taken direct from the 500-volt d.c. trolley. The first class is preferable because of the ability to utilize the a.c. motor and because the losses in distribution are lessened by the loss in transforming from alternating current to direct current. This loss varies from 9 per cent on rotary converters to 14 per cent on motor-generator sets. It is offset to some extent by the increased investment for purchasing the special transformer which is needed to reduce the potential of the high-voltage transmissions. It is possible to use standard transformers for this work at or near substations using motor-generators. The taking of d.c. business has its operating difficulties on account of the increased loss in delivering current and on account of such prevalent motor difficulties as running on a grounded circuit.

The opportunities we have are as follows: Local street railway line at both terminals; private lighting at all intermediate stations; street lighting at the largest of these stations; service for county and state institutions; power for stone crusher at quarries; power for sand pumps at river crossings; power for farmers at or near the right-of-way at any point on the line; power for country elevators and sawmills, and power for pumping city water.

Those who have combination lighting and street railway plants can safely base their rates on an increase of at least 10 per cent to 15 per cent over the rates charged in the cities. Those who are not acquainted with lighting rates should post themselves on what the local company is charging and figure accordingly. The lighting rate to-day is based on three main items: First, a consumers' charge which does not vary with consumption; second, an interest and depreciation charge based on the maximum demand, and, third, a charge based on the switchboard cost. The railway man might not consider the first two items in quoting a rate, and so would base his price on the manufacturing costs only. If he does he is surely giving a discriminating rate. If this is the case he not only is tearing down the system that is absolutely essential to the success of the central station, but he is also doing his own company an injustice by not getting all the revenue possible.

The exclusive railway plant of to-day has considerable difficulty in generating current at a lower cost than the city lighting plant. Intensive business methods are rapidly proving to the majority of power users the cheapness and the convenience of power from the central station. In consequence the load curve is much more conducive to low cost of power than that of the average railway plant without a storage battery. The dreaded and much-discussed peak load is gradually ceasing to be of importance in the mind of the central station manager. In our plant in Cedar Rapids the peak load during the six summer months comes at 2:30 p. m. This condition is due to a very active and successful campaign for power business, with the result that 78 per cent of the total number of our factories are run exclusively from the central station.

An increased rate for service in the country is justified, due to the increased cost to deliver the current. In the average distribution system for railway work the current is generated at a standard voltage, stepped up to high tension, transmitted and stepped down to the proper voltage for motor-generators or rotaries, transformed to direct current and distributed to the car by overhead trolley. Each step results in a loss. For lighting and power service the current is generated at the voltage at which it is distributed to the one set of transformers which is required to get the low voltage needed by the standard lamps and motors. That aggregate loss will

average 12 per cent to 13 per cent in well-designed plants, but in the railway example there must be considered an additional loss which will amount to a total of 25 per cent to 30 per cent, depending on the length of line and other factors. You are therefore justified in increasing rates by the difference of at least 10 per cent to 15 per cent. This does not handicap the company in any way in securing contracts because it is not difficult to create a demand.

Our policy in this regard follows our city practice on all a.c. connections made on or reasonably near the right-of-way. We buy the transformers, install them and run the line where there is a sufficient amount of revenue to warrant the investment. In some cases we have made the consumer stand the expense of the poles but we furnish the copper. Copper does not depreciate fast and one can well afford to follow this plan. This class of business is usually secured in villages and hamlets. The d.c. connection as a rule is made at quite an expense for line and we invariably insist on the consumer setting his own poles. This is the farmer's connection.

We furnish meters free of charge in all cases. All business taken on is contracted for on a meter rate with a minimum charge per annum to insure the fixed charges of the maximum demand. We employ, as in the cities, the two-rate method of charging. In case it is very apparent that the revenue to be received from the customer on the line is not sufficient to warrant a profit, we adopt the following method as far as the cost of the pole line is concerned. The pole line for this class of work costs about \$800 per mile. We will make a contract with the consumer whereby he pays us 15 per cent per annum on the cost of the line and, in addition to that, pays us for electrical energy at our regular rates. Should other consumers connect to the same line we leave it to them to settle the basis on which they pay us this 15 per cent. The 15 per cent covers interest and depreciation on the line in question and practically turns what would be a losing customer to one from whom we secure a profit.

The price of transformers for this work varies from \$32 per kilowatt for the 3-kw size to \$10 per kilowatt for the 25-kw size. Inasmuch as three phase is the prevailing transmission practice, three transformers are needed at each connection. It would be exceptional on the majority of interurban lines to secure a load for which transformer capacity of 75 kw was needed. In addition to this, special cut-outs are needed on the high-tension side of the transformers. These can be purchased for from \$40 to \$50.

As an example of the probable return and investment necessary to secure business in a small country town of 500 population I take the information from the report made for such a town. The city furnishes the following ultimate prospects.

	Kilowatts.
Connected load, power.....	15
Street lines connected load.....	16
Stores connected load.....	1½
Residences and churches, twenty-seven in number, connected load....	13½

Total connected load..... 46

On a basis of revenue for the same class of service in Cedar Rapids we have the following ultimate monthly returns:

Power, per month.....	\$20.00
Street lights per month.....	16.25
Stores, per month.....	10.00
Residences, per month.....	27.00

Total monthly revenue..... \$73.25

The investment necessary to connect up this load is given in detail below:

SUBSTATION EQUIPMENT:	
3-5-kw transformers, 16,500 volts, 220-110 volts.....	\$477.00
Remodel station for transformers.....	50.00
Switchboard and panel, high-tension.....	150.00
Switchboard for low-tension.....	150.00
Polyphase meter.....	80.00
	\$907.00

DISTRIBUTION AT 220-VOLT, THREE-WIRE:

Seventy 35-ft. poles, complete set.....	\$700.00
Wire for commercial lighting 3 miles, No. 0.....	1,066.60
Wire for street lighting 2 miles, No. 8.....	145.60
Street lamps, complete with regulator.....	300.00
Meters for consumers, forty at \$15.....	600.00

\$2,812.20

Total investment..... \$3,719.20

*Abstract of paper read at annual meeting of the Iowa Street & Interurban Railway Association, Davenport, Ia., April 20-22, 1911.

The foregoing contemplates the placing of the transformers on a shelf in the freight room at the station. This will not interfere with the use of the room for freight purposes, but it will increase the insurance undoubtedly. All the figures given are the estimated maximum amounts that the company will ever realize without considering the growth of the town. It will be seen that this revenue of approximately \$900 per annum can be secured for an investment of \$3,600, or that the gross receipts per annum would be only 25 per cent of the investment for supplying the service.

It is expected that the station attendant will be responsible for operating this equipment and that he will also collect the bills, or perhaps the collections would be put in the hands of the local bank or merchant.

Within the last two years the farmer has been placed on an equality with the city man as far as electric service at his home is concerned. The development of the low-voltage tungsten lamp has made it possible and practical to use electricity for light as well as for domestic utensils, such as flatirons, toasters, etc. Twenty-eight-volt lamps are used, which voltage permits the use of a storage battery at a very small relative cost. It has been found by belting a 28-volt generator to the gasoline engine with which almost every farmer is supplied that two hours' charging a day will give ample energy to supply a twenty-four-hour demand.

The farm business can be made profitable to the interurban railway by displacing the gasoline engine with a motor when satisfactory lighting service cannot be furnished direct. That condition would be true if the service to the farmer was supplied from the trolley. The poor speed regulation usually incident to trolley supply would not affect the lighting from the low-voltage plant because the switchboard is so connected that the battery floats on the line when the motor is running. By figuring ahead it is possible to use the combined capacity of the generator and battery, thereby permitting the use of a fair-sized motor. This layout certainly puts the farmers within reach of every city advantage. By it they can have their homes and barns lighted by electricity and thereby reduce the fire risk. They can have other conveniences, such as washing machines, irons and hot plates. They can also pump their own water to improve sanitary conditions in plumbing and reduce the labor in handling water for the stock. This development is not generally known to the farmer and so should be thoroughly advertised by the railroad operators.

We are considering very seriously another feature in regard to securing revenue on interurban lines. It has been decided by our operating department that a block system would be greatly to our advantage. The system that has been quite favorably considered provides for two-phase, 2200-volt power lines, on separate poles, extending the entire length of the right-of-way. The specifications of this system recommend the use of No. 10 wire connected through transformers from the high-tension lines at each substation.

In figuring out the auxiliary power situation in connection with the signals, we have decided that it would be feasible to install a larger size copper for the signal line and utilize it as a feeder for power for the farmers and the cities and towns en route. This would reduce transformer investment very materially and permit longer transmission than direct current. In case of a.c. distribution the high-tension transformers must be at the substation on account of the labor costs of attendance. On the other hand, the 2200-volt transmission will permit standard lighting transformers to be located at the best center of distribution. The revenue from this line would no doubt pay very large interest on the investment for the line itself.

To sum up, I have endeavored to give you my view of the possibilities of revenue from this class of business. It certainly must be profitable because it is quite common now for some of the larger stations to extend their lines for service of this class for a considerable distance. If it is profitable to invest money and depend on this revenue to make a profit, it surely will be profitable for the railroad man to make it a side line.

EFFECTIVE METHODS OF HANDLING SNOWSTORMS*

BY FRANK S. CUMMINS, TRAFFIC MANAGER THE INTER-URBAN RAILWAY, DES MOINES

There are few troubles in the lives of a street or interurban railway man to be compared with the fighting of a snowstorm. From the first day until the last day of winter he anxiously studies his barometer and all bulletins of the weather bureau. Every little snow flurry worries him, for no two storms are exactly alike. An innocent looking flurry of snow-white flakes may within an hour develop into a howling blizzard.

To be ready for a snowstorm, the wise operating man will perfect, in the fall, his fighting organization, will issue his orders, will overhaul his equipment and will distribute the necessary material and supplies to the proper points.

To begin with his equipment, he needs in this territory adequate plows and sweepers. Sweepers are most effective in paved streets and with girder rails. As usually built and equipped, they have the power to handle snow of a considerable depth and weight, sweeping and pushing it well to one side, and with an adjustable rotary brush on each end they can give the greatest service on single or double tracks. While plows may be used effectively in paved streets, they are most efficient on exposed T-rail construction, such as is employed on outside city lines and interurban lines.

The snow sweeper is an independent motor car, but the push plow may be an independent motor car, a work car or electric locomotive temporarily equipped with plows, or even for interurban lines a gondola or flat car equipped with a plow and pushed by a motor car. All of this equipment should go through the shops early in the fall for a thorough overhauling. It should be tested, and then each motor car or plow should be assigned to the place where it will receive proper care and be held in readiness for instant service.

All sweepers, plows or cars used for fighting snow should then be equipped with shovels, brooms, picks, chains, jacks, re-railing devices, sand and salt. The tools may be necessary for removing the snow from deep drifts, for picking a way through ice, for cleaning switches, frogs and crossings and for re-railing cars, regular or snow-fighting, which may leave the rails. The track department should distribute to its various divisions sand and salt for use by the track men on hills, frogs, switches and crossings, and a list should be made of the tools of each section, so that the manager will know that they are sufficient for snow-fighting purposes.

The master mechanic, the roadmaster and the trainmaster should receive instructions as to what is expected of them, and then in turn they should respectively issue instructions to the carhouse foremen in charge of the equipment, to the track foremen in charge of the tracks and to the road foreman in charge of operation and of the men who will actually handle the equipment.

The selection of men to handle the equipment is of the greatest importance. They should be chosen for their willingness, judgment and ability. Not every motorman makes a capable snow fighter. To be successful he must not be either timid or reckless, but should combine judgment with nerve. Experience only will teach a motorman the speed which is safe under all circumstances and the speed which is so slow that there is liability of the car becoming stuck.

In selecting these men, those living near the carhouse and those with house telephones should be given preference because of the possibility of hurried and night calls. The names of all these men should be listed with trainmaster and carhouse foremen, and the lines to which each sweeper or plow is assigned should also be listed.

An organization having now been built up, all equipment and material being ready and men being instructed in their duties, we are ready for the first storm. And "being ready" means much. A good start is often half the battle, and an

*Abstract of paper read at annual meeting of Iowa Street & Interurban Railway Association, Davenport, Ia., April 20-22, 1911.

"ounce of prevention is worth a pound of cure." With the first warning of trouble the men, sweepers and plows should be started. The men are trained, picked and loyal fighters. Given a chance, they will keep ahead of the storm; otherwise they will clean up the track after it is over.

When instructions are issued to govern crews in the operation of cars during snowstorms, the crews on regular cars should be considered as well as those on snow-fighting cars. Careless operation of these regular cars will cause endless trouble, because a derailed car will block the line and delay the progress of the sweepers and plows. All motormen should be taught to take no chances. Every switch, frog and crossing should be swept, and the cars should be run slow. All regular cars should be kept running as long as possible. This will help to keep the line open. When the cars commence to stall they should be taken off and put away until the line is cleared.

In open country on interurban lines it is advisable to protect all bad cuts with snow fences. Great protection can be obtained from them, for the greatest trouble comes from drifted snow.

A push plow of "V" shape, with the power to lift and throw the snow to each side, will clean out the ordinary short snowdrift. When the snow becomes too heavy and the drifts too long or too deep, care must be used in bucking them. If the appearance of such a cut is not satisfactory, stop, go out and look it over. The hardest snow is usually found at the mouth of a cut, and a diagonal drift offers danger from derailing.

The electric car derives its power by rotary motion of the wheels, and this gives to it great efficiency in snow fighting. It can, so to speak, grind its way through a drift at a very low rate of speed. I have seen an electric car time and again forcing its way through a drift at a speed much slower than that at which a steam engine will stall.

The phrase "bucking a drift" comes from the method employed here in fighting snow, in which the car takes a run at the big drifts and hits them hard at a good rate of speed. If headway is lost and the car fails to get through the drift or the cut, it runs the chance of getting stuck and of requiring help or a shovel gang to release it. However, here again the electric motor has an advantage over the steam locomotive. It can and will respond to the reverse so quickly that this alone saves it many times from becoming stalled. Thus one electric car, without much help or protection, can buck a drift repeatedly until it gets through, always saving itself after each effort. But experience has taught me that an electric car or locomotive must not be allowed to stand still long and spin its wheels. This has a tendency to melt the snow at the point of contact with the rail, and the car is likely to freeze and stay until helped out.

On interurban track it is my belief that when the snow is not more than 2 ft. or 3 ft. deep, and not badly drifted, it may be kept cleared by the passenger cars if some sort of solid pilot is used. With deeper or drifted snow, say 4 ft. to 5 ft. in depth, a plow is required, but the use of a solid pilot on regular passenger cars is even then advisable, because with deep snow a cut for some time will partially refill. This condition can be cared for by regular cars.

When snow becomes packed in cuts and around switches only the pick and shovel is safe. Dig trenches through the cuts or, if this is not sufficient, dig out sections and continue to buck with the plow until the cut is cleared. It is not customary with us to couple engines together when bucking snow; we depend instead upon the ability of one engine to handle the work. However, we keep reserve power on the line behind the engine to give assistance in pulling it out of a drift if it becomes stuck.

The first and most important thing is to clear the main lines. Then, when the storm is over, the sidings and other miscellaneous tracks may be cleared. There is considerable work on the tracks after the storm, which largely falls to the lot of the section man; but there is one important duty for

the chief, and that is looking everything over, repairing the sweepers and plows, replenishing the stock of sand, salt, tools, etc., and getting everything in readiness for the next storm.

Rarely in a man's experience does he have the opportunity of witnessing such loyalty as is displayed by all employees in their fight to open their "line." This pride of keeping the road open adds zest to the fight, and long hours and hardships do not dismay these loyal railroad men.

All efforts of the chief are for the one purpose in three parts—to re-establish the service, to regain the regular revenue and to cut out the extraordinary expense. To accomplish this he gets on the job early and stays there until it is all over, because cleaning up a snowstorm is not play; it is a man's job.

A CONVENIENT SHOP SCAFFOLD

The electric car repair shop of the Long Island Railroad is fully equipped with a convenient form of permanent scaffolding between the repair tracks. Light body repairs and painting are done while the car bodies are jacked up for electrical over-



Adjustable Shop Scaffold

hauling and the scaffolding between pits permits painting to be done without obstructing the aisle floor space with ladders or horses. A row of 8-in. x 8-in. wooden posts spaced about 14 ft. apart is set in the floor of each aisle. On two sides of these posts are bolted ½-in. x 4-in. iron plates with holes punched in them at intervals of 8 in. The metal which is punched out is bent back at the top so that when the scaffold bracket is raised the lug which fits into the hole is forced out of engagement. A triangular wooden bracket arm is attached on each side of the post. At the top of the vertical member of the bracket are bolted two iron straps which are bent around the iron plate on the face of the post. At the bottom of the vertical piece is a lug which engages in the holes in the iron plate. Each bracket is counterweighted by a piece of cast iron attached to a small wire cable passing over a sheave on the top of the post. The brackets on each side of the posts can be raised or lowered independently to any desired height. The scaffold boards are 10-in. planks trussed on the underside with a ½-in. rod.

ELECTRIC RAILWAY PROBLEMS OF THE DAY*

BY L. D. MATHES, GENERAL MANAGER UNION ELECTRIC COMPANY

In reviewing events transpiring in the street and interurban railway field during the past year, we find little that can be termed startling in the way of development of new practice—in the line of either equipment or operation. American street railway practice has become so refined that so far as can now be foreseen by the leaders in the profession the future will develop no marked innovations. It is rather a case of improving step by step the practices now existent.

It is gratifying to know that during the past year there has developed a keener interest in the standardization of apparatus and specifications. This greatly-to-be-desired situation is largely credited to the good work done by the committees of the American Electric Railway Engineering Association. These committees are still actively engaged, and the results of their deliberations and recommendations are proving of great value to the electric railway industry as a whole.

A subject of the greatest importance is that involving the standardization of operating rules for interurban and city lines, particularly the former. Many years were required by the steam railroads of this country to formulate standard equipment specifications and standard operating rules. The value of these standards from both an economic and a public safety point of view is too apparent to warrant extensive discussion. During the past year many of the most important interurban systems in the country have devoted much earnest consideration to the subject of block signals. This is following in the footsteps of our steam railway brethren, and is along right lines, as in the adoption of a block-signal system the companies provide protection of life and limb to the traveling public, improve the efficiency of their schedules and cut off the large losses due to accidents.

The prepayment car has long passed the experimental stage through its acceptance by the public as a unit tending to the acceleration of the schedule movement and largely to the elimination of platform accidents. The prepayment car is being built in many attractive forms. From a physical point of view it is the most important development of recent years so far as strictly city service is concerned.

Since the first of the present year many street railways have experienced disappointing returns of gross income. The most optimistic now admit that there is a feeling of uncertainty in commercial circles the country over, and no man can predetermine when the tide will turn. Few industries are more sensitive to the touch of depression than the average street railway. In view of the situation as briefly outlined the great problem of to-day is to resist the constantly increasing tendency of the expense of operation to approach in volume the gross receipts. The cry is to increase the efficiency of the service and to decrease the operating expense. A gentleman who has achieved much fame of late through suggesting to the steam railroads the solution of this problem has not yet accepted the proposition of the railways wherein he was told that upon the accomplishment of that which he said could be done he would have a blank check book and pen and ink given to him and be left alone with his conscience to dictate his salary. To improve the service and at the same time to reduce its cost has to many of us a ring of an Arcadian dream; but at the same time such results are being attained in many instances. With the depreciation of the physical property, the increase of wages and in some cases of material, the operating expense naturally is inclined upward. In times of big business the increase of gross expenses, keeping step with that of operation, holds the general average down to that which is regarded as a normal figure.

Under conditions such as are being experienced by the street railways to-day there is little hope for an increase of income,

consequently the only salvation is to decrease the operating expenses. No intelligent management looks with favor on the reduction of operation through the curtailment of necessary and legitimate maintenance charges. The physical property must be maintained to a high standard regardless of what may be the status of the income. The Boston Elevated Railway has recently appointed a committee which will give its entire attention to the matter of reduction of operating expenses. No detail will be too small for the consideration of this committee, the work of which will be followed with keen interest by the fraternity at large.

Coming down to "home affairs," that is, situations within our own State, I am pleased to say that the most important development of the year has been a demonstration by the lately adjourned Legislature of the inclination of the people to give the corporate interests more favorable consideration than has, to some extent at least, prevailed in the past. This does not apply to electric railways in particular, but to every form of investment of a character tending to benefit or develop any section or community. The usual number of corporation-baiting measures were introduced, but so far as I know no new laws have been made in Iowa which could be considered unjust or unfair. The burning issue in our great State is, Why has Iowa suffered a loss of rural population? The State Legislature was not called on to answer this question, but it has certainly not placed itself in the position where it could be charged with further contributing to this undesirable condition.

A law was enacted at the late session making it legal to issue securities to cover certain promotion expenses incident to the construction of electric railways or other utilities. The law also makes it legal to provide for a discount on bonds which may be issued for the purpose of constructing such utilities. This certainly indicates a broader spirit. In the past Iowa has not been an attractive field of investment, particularly in the electric railway line, on account of its very stringent corporation laws. The people of the State through reports filed by interurbans have awakened to the fact that they are not gold mines as assumed. The small towns and the rural communities are desirous of interurban development and will lend a helping hand more readily at this time than ever before.

Many States have been considering the public service commission question. This issue has been before the Iowa public for the past two years. The bill as introduced two years ago was after some modification re-submitted at the recent legislative session. It passed the House, but was tabled by the Senate. While it is probably but natural for the public to assume that the wicked corporations were offering daily prayers for the passage of the Iowa utility bill, it is a fact that the utility companies gave the matter but scant attention. Iowa will undoubtedly have a commission in time, but beyond question a delay will be of advantage to both the corporations and the public. As the issue is a most important one, it will be well for this State to avail itself of the experience of other States which are now engaged with the problem.

REORGANIZATION OF SOUTHERN CAR COMPANY BY NEW INTERESTS

J. Elwood Cox, president of the Commercial National Bank, High Point, N. C., has interested in the Southern Car Company J. B. Duke, of the American Tobacco Company, New York, and Abraham Cook, formerly connected with the St. Louis Car Company, and R. W. Morrison, both of St. Louis, Mo. The Southern Car Company has been operated at a disadvantage since the disastrous fire which damaged its works several years ago. The plan worked out by Mr. Cox for the reorganization of the company will provide \$100,000 of cash working capital—with no debts—and the company will have eighteen acres of land and a well-equipped plant with some fifteen cars in process of manufacture and a goodly quantity of lumber and materials. A meeting of the company is to be held on May 1, 1911, to elect new officers and directors.

*President's address read at eighth annual convention Iowa Street & Interurban Railway Association, Davenport, Ia., April 20-22, 1911.

PUBLIC UTILITY COMMISSION CONFERENCE IN NEW JERSEY

In accordance with the request of the Board of Public Utility Commissioners for the State of New Jersey, a conference on electric railway matters was held in Trenton, N. J., on Friday, April 21, between members of the board and representatives of electric railways of the State. Those present at the conference were Thomas J. Hillery and Robert Williams, commissioners; Alfred N. Barber, secretary of the board; Philander Betts, chief inspector utilities division; two inspectors of the board, and about twenty-five railway men who represented sixteen companies.

The conference was opened by Mr. Betts, who said that he had been ordered to draw up a set of minimum requirements for governing the operation of street railways. These requirements could be considered under the following heads: Way and structures, including standard construction of bridges and protection of grade crossings; block or other signals and train dispatching; car equipment; conduct of and treatment by employees.

WAY AND STRUCTURES

Among the minimum requirements suggested by Mr. Betts under way and structures was that the right-of-way should be kept free from obstruction; that track and roadway should be maintained in a substantial manner by properly ballasting tracks, renewing trestles and maintaining rail fastenings, joints and special work; no stub-end switches should be allowed except on tracks under construction; the paving should permit the proper crossing of tracks by teams at authorized crossings and be so smooth as not to interfere with the proper operation of fenders or wheel guards. The floor systems of bridges and trestles should be similar to those used by steam railroads. In general, he recommended the bridge standards laid down by the Massachusetts Railroad Commission, which he quoted as follows;

"Ties shall be of hard pine, and not less than 5 in. x 7 in., and not less than 8 ft. long. The board suggests the length of 9 ft. ties should be spaced not over 8 in. in the clear. The board suggests a spacing of 6 in. in the clear. Ties should be properly fastened to the stringers by spikes or bolts. Along the ends of the ties should run on each side a wooden guard timber not less than 6 in. x 6 in., notched 1 in. over the ties and bolted to every third or fourth tie. The office of this guard timber is not to prevent a derailed wheel from running off the bridge, but simply to keep the ties in place. With ties 9 ft. long, this guard timber will be 15 in. to 18 in. clear outside of the track rails.

"In order to prevent a derailed truck from running far from the track even if it should be derailed before reaching the bridge, inside guard rails should be provided. These rails should be of the same height as the track rails, and should be extended across the entire bridge, and for a distance of some 50 ft. beyond—the ends coming to a point in the center of the track—the point being protected by a casting or frog point."

Continuing, Mr. Betts said that if there is a sharp curve on the approach, the guard rails should be extended around the curve. These rails should not be less than 8 in. in the clear inside of the track rails and should be securely spiked down to every tie. Such inside guard rails, in most cases, guide a derailed truck safely across the bridge.

Drawbridges used exclusively for street railroading should be provided with smashboards so located as to give ample opportunity to bring the cars to a full stop before reaching the bridge and so interlocked with the mechanism of the draw as to assure the dropping of the smashboard whenever the draw is opened.

The overhead system must be maintained to eliminate danger from falling wires. High-tension crossings should be constructed in accordance with the specifications adopted as standard by the American Electric Railway Association.

At road crossings on interurban lines proper signs should be installed to warn teams of the approach to a railroad line. At important crossings, which may also be stations, clusters of lights should be installed.

At each crossing of a steam or high-speed electric line by the line of an electric railway the electric railway should provide derailing switches in its track, located at least 120 ft. from the line of the steam railroad. Where the derails are not operated from a tower, the operating device is to be so located that the conductor or other authorized person, when operating the derail, can have a full view both ways along the line of the steam railroad tracks. The trolley wire should have approved trolley guards. If the crossing is not already lighted by the municipality, the electric line should provide illumination which should at least be sufficient to indicate to the motorman of the electric car the presence of a crossing with another railway.

BLOCK SIGNALS

All high-speed electric railways and all suburban or semi-suburban single track lines should be equipped with some method of positive block signals or else an approved method of dispatching, operated by telephone or telegraph from a single office, with manually operated signals; the signal boxes should be of a type which can be operated only by a special key or handle in the possession of the motorman, and the motorman should never allow any one to operate the signal except himself.

The approach to every trestle, drawbridge, grade crossing, sharp curve, turn-out or other dangerous point should be marked by a cluster of lights to give notice to the motorman that special care on his part is required.

CAR EQUIPMENT

All closed cars in operation between Oct. 15 and May 1 should be equipped with heating apparatus to be used whenever the outside temperature is lower than 40 degrees Fahr. The interior of the car should be kept at a temperature of not less than 50 degrees Fahr. nor more than 60 degrees Fahr.

Cars in cities and towns should be provided with either fenders or automatic wheel guards. The front end of projecting fenders should be not more than 6 in. above the rail when in the normal position; and the front end of automatic wheel guards should not be more than 4 in. above the rail when in the normal position. All cars not equipped with automatic wheel guards should have some type of rigid pilot board with a clearance of not more than 4 in. above the rail. In cities where there is much congestion automatic wheel guards are more desirable than projecting fenders. Interurban cars operated over a private right-of-way should be equipped with pilots mounted not more than 5 in. above the rails.

All new cars or reconstructed cars having the car floor more than 30 ft. above the street level should be provided with two steps between the rail and car floor. No step of any such type of car should have a rise of more than 17 in.

Every suburban electric car in motion between sundown and sunrise should have a headlight located on the front dash and a tail-light located on the side of the car near the roof at the rear end. The tail-light should show red toward the rear and green toward the front, and should be supplied by energy from sources independent of the supply of power to the car. No car, when operated over city streets, should exceed a speed of 15 m.p.h. No car moving at a speed exceeding 10 m.p.h. should follow another car moving in the same direction at a shorter interval than 100 ft. unless coupled thereto.

All cars whose loaded weight exceeds 20 tons should be equipped with air brakes and cars in interurban service should also have air whistles. All cars, except those on seashore roads, should be equipped with efficient sanding apparatus. All cars must be equipped with gongs for sounding a warning to approaching persons or vehicles, and should have route and destination signs. All cars operated over trestles exceeding 10 ft. in height should be equipped with some type of bars or guards to prevent passengers from falling.

On single-truck closed cars not more than three persons,

besides the motorman, should be allowed to ride on the front platform. On open cars not more than four persons should be allowed on the front seat. On double-truck closed cars and on all interurban cars no passengers should be allowed to ride on the front platform. No one should be allowed to ride on the platform steps of a car at any time. On interurban lines, with cars at half-hour or longer intervals, shelter sheds should be erected at regular stations and at transfer points.

CONDUCT OF AND TREATMENT BY EMPLOYEES

All car service employees should be courteous and forbearing in their treatment of passengers. They should endeavor to assist passengers in getting to their destination by announcing important street intersections, transfer points and other important steps for the benefit of passengers, particularly of strangers. All companies should adopt the standard operating rules of the American Electric Railway Association.

DISCUSSION ON WAY AND STRUCTURES

The discussion on way and structures was opened by Martin Schreiber, engineer maintenance of way Public Service Railway. Mr. Schreiber said that there were not many things in Mr. Betts' paper to which exception could be taken, but some things could be added, such as the standardization of rails. He spoke in favor of the T-rail, except for the heaviest traffic over paving.

Referring then to paving, Mr. Schreiber said that the use of asphalt or other monolithic pavement directly against the rail was undesirable because the pavement would be broken by rail vibration. The best pavement was natural stone block, like granite or a trap-rock, but brick or wooden block was far more desirable than asphalt. Some city engineers were demanding the use of concrete under ties. Four or five years ago there had been a wave of sentiment in favor of concrete in street railway track construction, but many companies which had used concrete under ties had returned to broken stone ballast. He said with regard to bridges that it would be impracticable in many cases, especially in towns, to have a smashboard interlocked with the drawbridge. It was inconvenient even to have the rail-lifts interlock with the drawbridge mechanism. On the Public Service Railway circuit-breakers were inserted in the trolley wires about 1000 ft. from the drawbridge, so that when the draw opened the current would be automatically cut off the trolley. Hence there would be very little chance of a car running up to a drawbridge without the motorman noticing that the power was off.

DISCUSSION ON RAILROAD CROSSINGS

R. E. Danforth, general manager Public Service Railway, said that railroad crossings had been illuminated in many instances. However, it was rather dangerous to use a bank of five lights to call the attention of the motorman to a danger point because in a thunderstorm the lights might be burned out. It was better to have a mark which could not be changed by ordinary elements. He preferred to have the poles placed reasonably near the track, painted white and marked with black rings or some other sign. Such poles could be easily seen from a car equipped with a good headlight.

G. A. Gilfillan, consulting engineer Morris County Traction Company, doubted whether 120 ft. was a good limiting distance for a derailing switch. He believed that 50 ft. to 75 ft. would be better. Really, every crossing was a study in itself. The type of crossing, signal tower, etc., to be used should depend upon the importance of the location. Mr. Schreiber also thought that 120 ft. was too great a distance from the crossing for a derail, especially in congested streets where wagon traffic might obscure the view. In towns a distance of 60 ft. to 75 ft. would be more reasonable. J. N. Akarman, general superintendent Atlantic City Electric Company, also argued against a long distance. Mr. Danforth suggested that Mr. Betts amend his suggestion to read that the switch be put at such a distance as would insure the derailment and stopping of the car before it reached the nearest railway track.

DISCUSSION ON WAITING ROOMS

H. H. Archer, manager Morris County Traction Company, opened the discussion on waiting rooms. He agreed with Mr. Betts that on interurban lines, and especially where the head-

way is 15 minutes or more, waiting stations would be both a convenience to the public and a means of increasing the railway's returns. It was difficult, however, to prevent such structures from being converted into nuisances. Mr. Akarman said that he had found it necessary to take out the fronts of every shelter station which originally had had doors and windows because of nuisances, although the structures were in sparsely settled territory.

W. O. Hay, general manager Northampton Traction Company, said that he had built over 100 shelters with the south side open. He had found the use of whitewash on the walls effective against defacement. The shelters had been erected at a very trifling cost because local merchants were offered the use of the shelters for advertising purposes provided they paid for the material. The shelters were three-sided and were large enough for 10 to 15 people. The company's expense was about \$3.80 each, including cartage, roof-covering and foundation poles. Mr. Hay said that there was keen competition for the shelter advertising privilege.

It was suggested by Mr. Betts and others that the defacement of shelter walls could be effectively prevented if the walls were covered with sand after the first coat of paint.

DISCUSSION ON CARS AND EQUIPMENT

The discussion on car equipment was opened by Mr. Danforth, who did not agree with the recommendation that all cars not equipped with automatic wheel guards, fenders or pilots should be supplied with a pilot board having a clearance of not more than 4 in. above the rail. He said on many macadamized country roads the street surface rises more than 4 in. in winter and the amount of rise is generally limited only by the motor clearance, which usually is about 4½ in. A pilot board which extended along the front of the truck would act simply as a drag for slush and snow. This requirement, therefore, would be a bad one for small companies who could not afford snow-fighting equipment, plows and scrapers. He agreed with the step recommendations if it was understood that the step from the platform into the car was included in one of the two steps. He said that Mr. Betts' remarks on car lights called for practically the standard steam railroad tail-light on all suburban cars. Such practice was advisable on high-speed interurban cars, but not on city cars running over suburban tracks. Referring to car speeds, Mr. Danforth thought that it was a hardship to restrict the speed of cars to a lower maximum than automobiles. Trolley cars should be given at least the same speed limit. They were confined to specified tracks, they did not turn corners unexpectedly and they were a much greater public convenience. Any regulation regarding speed limits should define the character of the traffic and state the locality to which it is intended to apply.

The discussion on car signs was opened by Rankin Johnson, general manager Trenton Street Railway. He did not believe in a multiplicity of signs and thought that a sign at each end of the car was enough. The principal thing was to have a sign which was legible at a reasonable distance. Signs on the sides of a car were unnecessary.

Mr. Betts thought that the use of initials or numbers for indicating routes was not satisfactory because strangers in the city would not understand them. Mr. Danforth considered the old display destination sign, in conjunction with a sign denoting the route, the most satisfactory. He said that the Board of Supervising Engineers, Chicago Traction, advocated the use of a side destination sign in the upper panel of one of the center windows rather than a sign near the step because people could see it before they attempted to board the car.

Mr. Betts brought up the subject of using platform gates on closed cars and bars on open cars when crossing trestles. A discussion followed on the necessity of this precaution.

DISCUSSION ON OPERATING RULES

N. W. Bolen, superintendent of transportation, Public Service Railway, gave a brief description of the method used by his company to insure obedience to the operating rules. He said that the Public Service Railway's system of training employees was first to send them to a school of instruction, where

they were taught that courtesy to patrons and obedience to the rules were the prime considerations. After the school course a student had to answer certain questions put to him in order by the instructor, the supervisor, the depot master and the platform instructor, who gave him the final lessons. The Public Service Railway used the American Electric Railway Association's Denver code of city rules.

Mr. Danforth said that he was radically opposed to having passengers ride on the platforms any time anywhere. Mr. Betts mentioned that the Pennsylvania Railroad Commission does not permit front platform riding except on the first bench of open cars, and even there the number is limited to four passengers. In reply to a question by Mr. Betts, Mr. Danforth said that the Public Service Railway did not oppose the use of the rear exit on prepayment cars, although passengers were encouraged to leave by the front door, as at transfer points.

MISCELLANEOUS

In reply to Mr. Mead, inspector of the board, Mr. Schreiber said that on the Public Service Railway regular monthly bridge and trestle inspections were made by the division roadmaster, and that these inspections were checked up by the operating men. If anything serious was discovered it was reported at once by the operating department or by the track walkers who went over the bridges every day. The engineering department also made a thorough inspection at the end of the year when recommendations were prepared for any extensive repairs.

Recommendations were also made by outside engineers in special cases. The maintenance of bridges was often a matter of special agreement with each municipality.

Mr. Betts brought up the classification of car miles and car hours. He submitted a pamphlet embodying proposed additions to electric railway reports under these heads. He divided car miles into passenger car miles, active, idle and special. He also specified car-mile records for mail, express, freight, mixed, non-revenue and electric locomotive. He classified car hours into active and idle for passenger cars, special cars, mail cars and express, freight and mixed cars. These data were to be accompanied by general statistics on the number of passengers carried. There was a discussion as to what should be considered as constituting a car mile and a car day. It was generally agreed that eighteen hours could be considered a car day, so that if a car was running three hours it would be entered as having served one-sixth of a car day.

THE NEW UTILITY LAW FOR NEW JERSEY

The recommendations of Governor Wilson of New Jersey to the Legislature urging the enactment of a bill to increase the jurisdiction and powers of the Board of Public Utility Commissioners of New Jersey were carried out by the enactment of Senate bill No. 364 just before the legislative session closed on April 21, 1911. This measure is a conference committee substitute for Senate bills Nos. 5, 14, 19 and 30 and Assembly bill No. 167, and was signed by the Governor the day that it was passed. The act is quite a voluminous one and consists of four articles and forty-three sections, which may be briefly summarized as follows:

According to Article I, the commission will consist of three persons to be appointed by the Governor with the consent of the Senate. The present board shall be the new board until the term of office of each commissioner expires. The Governor can remove any commissioner for neglect of duty or misconduct after public hearing. The compensation of each member is to be \$7,500 per year and traveling expenses. No member or employee of the board shall be connected with, or hold stock in, any public utility company of the State. The total expenses of the board, including salaries, are not to exceed \$100,000 per annum. The term "public utility" is defined as any individual, co-partnership, stock company, etc., which may "own, operate, manage or control within the State of New Jersey any steam railroad, street railway, traction railway, canal, express, subway, pipe

line, gas, electric light, heat, power, water, oil, sewer, telephone, telegraph system, plant or equipment for public use under privileges granted or hereafter to be granted by the State of New Jersey or by any political subdivision thereof."

Article II defines the powers of the board. It can act on its own initiative or on complaint. It can conduct appraisals of the property of public utilities. It has power after a hearing to fix rates and to require just and reasonable tolls, regulations, measurements, services, etc. It may test meters. It can require steam and street railways to make reasonable connections to promote the convenience of shippers of property or passengers, to maintain their property and equipment in adequate condition, to make extensions when the business to be obtained and the financial condition of the company warrant the construction, to adopt a standard system of accounting, to establish and maintain adequate depreciation accounts, to investigate accidents. When a company increases its rates the board, either upon written complaint or upon its own initiative, shall have power to determine whether the increase is reasonable, and during the hearing to require the old rate to remain in force.

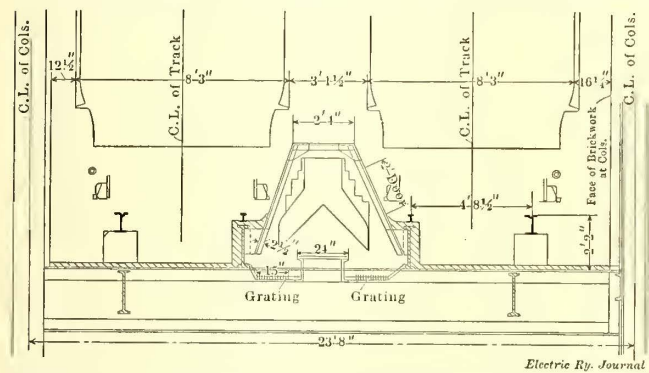
Article III prohibits public utilities from charging unreasonable and discriminatory rates, from issuing stock and bonds or other evidences of indebtedness payable more than one year from their date without obtaining authority from the board, to capitalize the franchise to be a corporation or any franchise in excess of the amount (exclusive of any taxes or any annual charge) actually paid to the State or any political subdivision thereof as a consideration of this franchise, to capitalize any contract for consolidation, merger or lease except that stock may be issued subject to the approval of the board by any lawfully merged or consolidated public utilities. Discrimination or free service is prohibited to any local, municipal or county officer. No sale, lease, mortgage or consolidation is to be made without the permission of the board, and any made without such permission is void. No public utility, without the approval of the board, shall sell its stock to any other public utility in the State, or shall sell or allow the transfer on its books to any corporation, domestic or foreign, of a majority interest in its stock. No passenger or freight station is to be abandoned, and no more grade crossings between railways, either steam or electric, shall be made without the approval of the board, which has power to order the installation of gates or other safety provision at any existing crossings. Every public utility at the request of the board must file with it a statement of the authority, powers and duties of different officers. No franchises are to be granted in the future in any political subdivision of the State unless approved by the board.

Article IV describes the procedure of the board. It can draw up rules for its own hearings and need not be bound by the technical rules of legal evidence. The board can compel by subpoena the attendance of witnesses and the production of papers, books, accounts, etc. No person shall be excused from testifying or producing any book, document or paper upon order of the board on the ground that it may tend to incriminate him, but no person shall be prosecuted on account of any act concerning which he shall testify under oath or shall produce documentary evidence by order of the board. A fine of \$100 a day may be imposed for default of compliance with any order of the board, and individuals are also liable to prosecution for misdemeanor. Orders of the board may be reviewed by the Supreme Court, to which is given authority to set aside any order when there is clearly no evidence before the board reasonably to support such order, or if it is without the jurisdiction of the board. The institution of proceedings to review any order of the board by the Supreme Court shall not stay the order of the board unless the Supreme Court or some justice thereof shall so direct. Proceedings in any court of the State directly affecting an order of the board to which the board is party shall have preference over all other civil proceedings pending in the court. The act goes into effect on May 1, 1911.

SAND-DRYING PLANT OF THE METROPOLITAN STREET RAILWAY, NEW YORK

The Metropolitan Street Railway, New York, dries all of the sand required for supplying the car boxes and the sand cars operated on the entire system in a large rotary drier plant located in the basement of the new carhouse at Ninth Avenue and Fifty-fourth Street. From 200 cu. yd. to 300 cu. yd. of sand is required per week during the winter months, but the drier has a guaranteed capacity of 100 cu. yd. per day of 10 hours, so that ample reserve capacity has been provided. The wet sand bin will hold 1600 cu. yd. and the dry sand bin will hold 700 cu. yd. In addition to this supply about 1000 cu. yd. is stored under cover in a carhouse at Tenth Avenue and Fifty-fourth Street. This sand is available in case of emergencies when no fresh supply of wet sand can be obtained to replenish the bins in the Ninth Avenue carhouse.

The sand used is a fine sharp quartz, free from loam, pebbles

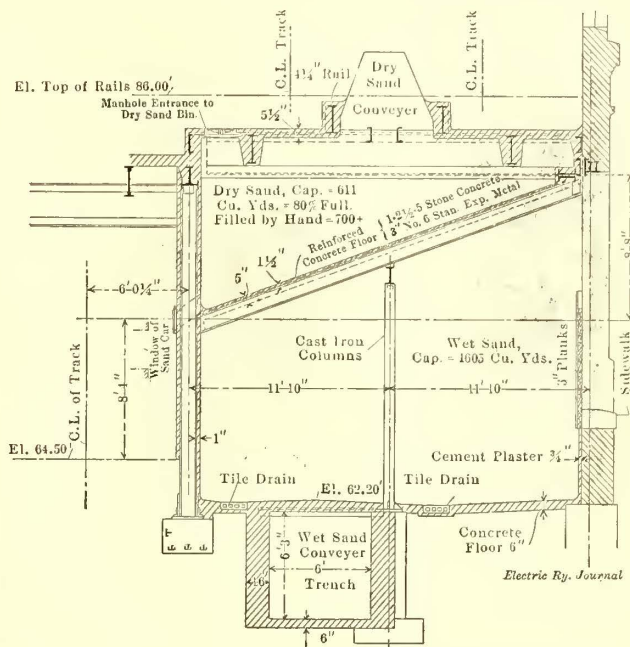


Metropolitan Street Railway—Cross-Section Through Dry Sand Conveyor

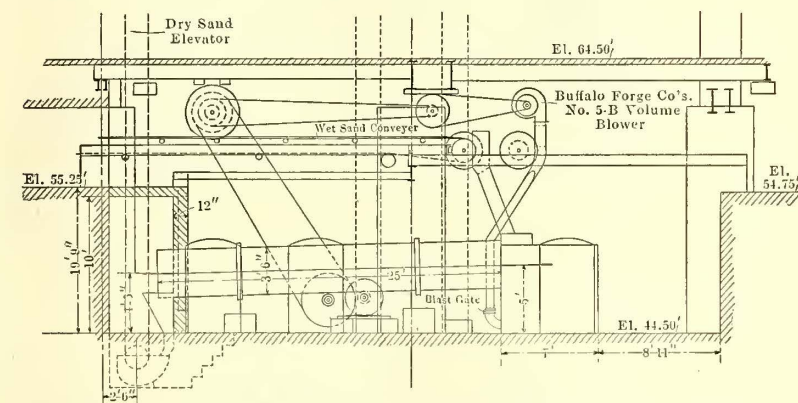
and other foreign matters. It is dredged from the bottom of Long Island Sound and is delivered on barges in quantities up to 500 cu. yd. to a convenient pier on the North River. From the barges the sand is hauled to the Ninth Avenue carhouse in dump wagons having a capacity of 2 cu. yd. each. These wagons and their drivers are furnished by the maintenance of way department, which keeps them at work at other times hauling track material. The wagons are backed in on the sidewalk

columns. The seven dumping doors in the outside wall are closed with rolling steel shutters and removable plank gates are provided on the inside to relieve the shutters of any pressure when the bin is piled full. There are no partition walls in the wet sand bin.

A concrete tunnel 6 ft. wide and 5 ft. 8 in. high is built under the entire length of the wet sand bin to house the wet sand belt conveyor. Eleven hoppers in the floor of the bin dis-



Metropolitan Street Railway—Cross-Section Through Wet and Dry Sand Bins



Metropolitan Street Railway—Longitudinal and Cross-Section of Drier Room, Showing Driving Shafts

of Fifty-fourth Street and the sand is dumped into any one of the seven openings in the north wall of the wet sand bin which occupies the center of the building on the Fifty-fourth Street side with the floor 4 ft. below the level of the sidewalk.

The wet sand bin is 165 ft. long, 22 ft. wide, 11 ft. high at the back and 18 ft. high at the front. The sloping ceiling, which is of reinforced concrete, forms the floor of the dry sand bin above. The floor is of plain concrete, 6 in. thick, and is sloped toward two longitudinal rows of tile drains which discharge the seepage water into the transfer table pit drains. The interior walls of the bin are formed of 8-in. cement-faced brick arches, built in between the twin channel

charge the wet sand onto the conveyor below. This conveyor has a 14-in. rubber belt which runs at a speed of 250 ft. per minute when both driers are being run, and at half that speed when only one drier is being run. The belt is driven by a 22-in. pulley on a jack shaft which in turn is belted to the main countershaft suspended from the ceiling of the drier room. This countershaft is belted to a 40-hp C. & C. motor running at 535 r.p.m. When only one drier is being run the

conveyor driving pulley shaft is belted to a second jack shaft so as to reduce the number of revolutions per minute by half and lower the speed of the conveyor to correspond with the capacity of the single drum.

The wet sand conveyor discharges into a divided chute which drops the sand down into the front ends of the two rotary drying drums which are mounted on the basement floor, 20 ft. below the floor of the wet sand bin. The drier room is 46 ft. x 34 ft., and provides space for the steam-heating plant boiler in addition to the two drier drums and furnaces. The heating boiler and drier furnaces are designed to burn anthracite pea coal and storage space for 165 tons is provided in

two vaults under the sidewalk of Fifty-fourth Street. Ashes are removed in cans which are hoisted on a hand elevator through a shaft opening onto the sidewalk.

The sand driers, which were furnished by the American Process Company, consist of a furnace for burning the coal and sheet-iron cylinder into which the hot gases from the furnace discharge under forced drafts. The drying drum or cylinder is 25 ft. long and 42 in. in diameter. On the interior are riveted a number of iron shelves which catch the



Metropolitan Street Railway—Wet Sand Storage Bin

sand at the bottom of the drum, lift it as the drum rotates and drop it at the top so that it falls through the blast of hot furnace gases. The drum rotates on two steel tires which rest on a pair of rollers driven through bevel gearing from the main countershaft suspended from the ceiling of the furnace room. It has a slope of 7 in. from the furnace end to the dry sand end and the wet sand hopper discharges into the upper end. As the drum rotates the sand is continuously raised and dropped through the hot gases, and the slope of the drum is sufficient to cause the sand to work its way slowly out to the discharge end. The rate of drying is regulated by varying the volume of hot gases sent through the drum by the blast fan. This fan is mounted under the ceiling of the furnace room and is belt driven from the main countershaft. The blast is controlled by slide dampers in the pipes leading to each furnace. Either drum may be rotated independently of the other by means of clutches on the bevel-gear driving shaft.

The two drums project 15 in. into a concrete flue chamber 10 ft. high and 4 ft. 9 in. deep at the discharge end, and the dry sand falls into a sloping hopper which carries it down to the hood of the dry sand elevator. The gases are carried off from this chamber through breeching which connects with the stack in southeast corner of the furnace room. The dry sand elevator is a 10-in. belt carrying buckets 8 in. x 5 in. spaced 24 in. apart and running at a speed of 232 ft. per minute. It lifts the sand to the level of the second floor of the carhouse and discharges it over a screen onto the dry sand conveyor, which distributes it to the dry sand bin. The distributing conveyor is a 12-in. belt running at a speed of 150 ft. per minute. It is housed in a dirt-proof casing built in between two storage tracks on the second floor of the carhouse and extends the full length of the dry sand bin. Continuous openings 15 in. wide and covered with coarse screens allow the sand to drop through into the bin from the spouts of the automatic tripper on either side of the conveyor track. The elevating and distributing conveyors are both driven by a 6.8-hp motor, running at 816 r.p.m., which is mounted on the

floor near the elevator head. Special care was taken in installing the dry sand conveyors to inclose them in dust-proof coverings so as to prevent fine dust and grit from being liberated on the second floor.

On the first floor a sand car loading track is built along the inside wall of the wet sand bin, and collapsible spouts with undercut gates are placed at intervals of 11 ft. 6 in. in the bottom of the dry sand-bin wall. These spouts are designed to discharge the sand through the window openings of the sand cars, and they are spaced so that two spouts can discharge simultaneously into both ends of a car. The loading track will accommodate six cars at one time.

The plant requires one fireman, one laborer and a helper to operate it at its full capacity. One or both driers are operated for a full day's run for two to four days per week, according to the demand for sand. During May, June and July, 1910, 868 cu. yd. of sand was dried at a cost of 15.87 cents per cubic yard. The labor charge for two men at \$2 per day and one man at \$1.75 per day was \$65.35, and 57,590 lb. of coal, costing \$2.80 per gross ton of 2240 lbs., was burned. The total cost of operating the plant for the three months was \$137.77.

The plant is operated under the direction of H. H. Adams, superintendent of rolling stock and shops of the Metropolitan Street Railway.

PRESIDENT TAFT VISITS ANNAPOLIS IN ELECTRIC PRIVATE CAR

The Washington, Baltimore & Annapolis Electric Railroad recently completed a very fine private car, principally for taking parties of government officials, foreign visitors and other sightseers from Washington to the Naval Academy at Annapolis. The car was first placed in service on Tuesday, April 18, when it had the honor of transporting President Taft and a party of distinguished guests from Washington to attend the unveiling in Annapolis of a monument to the French soldiers who fought in the American Revolution. This monument had been erected on the campus of St. John's College, where it was dedicated after addresses by Dr. Thomas Fell, president of St.



President Taft at Annapolis

John's College; William H. Taft, President of the United States, and J. J. Jusserand, French Ambassador at Washington.

The formal presentation of the monument to the college was made by Edmund Wetmore, acting president of the Sons of the Revolution. The monument was unveiled by Miss Amelia de Paun Fowler, a descendant of the Count de Grasse, and the Count de Chambrun, a descendant of the Marquis de Lafayette. Among those who were in the presidential party,

besides the President and Mrs. Taft, were the Secretary of War and Mrs. Dickinson, Secretary of Agriculture Wilson, Major General and Mrs. Leonard Wood, Admiral and Mrs. Wainwright and Mr. Wetmore. All arrangements for the trip were made by J. N. Shannahan, vice-president and general manager Washington, Baltimore & Annapolis Electric Railroad.

THE WASHINGTON UTILITY LAW

The Governor of Washington on March 18, 1911, signed the act to create the Public Service Commission of Washington to succeed the Railroad Commission of Washington, the members of which are to continue in office as members of the Public Service Commission until the expiration of their terms of office. The new commission is to consist of three persons to be appointed by the Governor with the consent of the Senate. The first commissioners are to serve for six years, four years and two years respectively. Thereafter the term of office of each commissioner is to be six years. Each commissioner is to receive a salary of \$5,000 a year. A secretary to receive \$2,000 a year salary is to be appointed by the commission. Other officers of the commission are to be a rate clerk and statistician at not more than \$3,000 a year, an engineer at not more than \$3,000 a year, an inspector of safety appliances at not more than \$3,000 a year, an expert accountant at not more than \$1,800 a year, a stenographer at not more than \$1,800 a year, and such engineers, inspectors, accountants and other assistants as the commission may deem necessary. The commission is to have jurisdiction over all public service companies in the State.

No street railway is to charge more than 5 cents for one continuous ride within the limits of any city or town, and every street railway is to furnish its passengers with transfers entitling them to a continuous trip over and upon portions of its lines within the same city or town not reached by "the originating car * * * upon such terms as are just and reasonable."

The commission is authorized to fix rates, fares or charges, and where rates, fares or charges are insufficient to yield reasonable compensation the commission is empowered to determine the charges and to fix the same by order. It is also given power to fix joint rates and through routes on railroads. Every public service company is to notify the commission of every accident which results in death or injury to any person. The commission is authorized to investigate all accidents and to order repairs or changes in railroad property wherever it deems changes or repairs necessary. It may even compel the suspension of traffic until repairs are made.

Copies of all complaints are to be served upon the companies affected and not less than ten days are to intervene between the date of service of the complaint and the hearing. All orders and findings rendered by the commission are to become operative twenty days after service, unless the commission deems that additional time is reasonably necessary to comply with the order. Every company that violates an order of the commission is liable to a fine of \$1,000 a day for each offense and every officer or employee of a company who violates an order of the commission is to be deemed guilty of a gross misdemeanor.

Appeal for a writ to review the finding of the commission may be made to the Superior Court of the county in which the proceeding was instituted within thirty days of the date of the order of the commission, and the court is empowered to restrain the commission from enforcing its order pending the determination of the suit. Appeal from the finding of the Superior Court may be made to the Supreme Court of the State. The transcript of the proceedings before the Superior Court is to constitute the record on appeal to the Supreme Court.

When complaint has been made to the commission concerning the reasonableness of any rate or charge and the commission has determined that the charge is excessive, the commission may order the company to pay to the complainant the amount of the overcharge with interest from the date of collec-

tion. If the overcharge is not paid within the time fixed in the order, suit may be instituted to recover same, and the findings and order of the commission are to be *prima facie* evidence of the facts therein stated. "All complaints concerning overcharges shall be filed with the commission within two years from the time the cause of action accrues, and the petition for the enforcement of the order shall be filed in the court within one year from the date of the order of the commission."

Every street car is to be equipped "with proper and efficient brakes, steps, grab irons or hand rails, fenders or aprons or pilots, and with such other appliances, apparatus and machinery necessary for the safe operation of such street car as the commission may prescribe." The commission is empowered to change or modify standards of equipment at any time or to provide different standards of equipment under different circumstances and conditions and is to fix a time within which such modification or change is to become effective or obligatory. The inspector of safety appliances of the commission is to report to the superintendent of the road affected all defects in equipment and appliances which render their use dangerous and is empowered to order any car or locomotive out of service until repaired and put in good working order. In the case of a defect in any track, bridge or structure the inspector is to report to the commission and to the official in charge of the railroad upon which the defect is found.

The commission is authorized to inspect the books and other documents of any public service company and to examine under oath any employee. Every company is to report annually to the commission and answer specifically all questions propounded by the commission. The annual reports are to include the amount of capital stock issued, the dividends paid, the surplus fund, if any, the number of stockholders, the funded and floating debts and the interest paid thereon, the cost and value of the company's property, details of franchises and equipment, the number of employees and the salaries paid each class, the accidents to passengers, employees and other persons, the cost of the accidents, the amounts expended for improvements and such information in relation to rates, charges and contracts as the commission may require. The commission is also empowered to require any public service company to file a monthly report of receipts and expenses.

In regard to the valuation of the property of the public service corporations the measure says in part:

"The commission shall ascertain the cost of construction and equipment and the cost of reproducing in its present condition the property of every public service company; the amount and present market value of the capital stock and funded indebtedness of every company; in the case of companies engaged in interstate business, the relative value of the use to which such property in this State is actually put in the conduct of interstate business and State business respectively; the total market value of the property of each company; the time intervening between the expenditure of money in the cost of construction and the time when returns in the shape of dividends were first received; the probable earning capacity of each company under the rates now charged and the sum required to meet fixed charges and operating expenses, and in case of a company doing interstate business the probable earning capacity of intrastate business and the sum required to meet fixed charges and operating expenses on intrastate business, and the relative proportion of intrastate and interstate business, the relative proportion of the operating expenses connected therewith, the relative proportion of the revenue which should be derived therefrom; the density of traffic and of population tributary to every company; the existence of grades, curvatures and other physical conditions affecting the movement of traffic and business of common carriers, and whether the expenditures made in procuring property were justified by the existing conditions, and whether the money expended has been reasonable for the present needs of the company, and for such needs as may reasonably be expected in the immediate future."

The sum of \$118,146.68, or such sum as may be necessary, is appropriated to carry out the provisions of the act.

METROPOLITAN STREET RAILWAY REORGANIZATION PLAN

At the hearing before the New York Public Service Commission, First District, in regard to the reorganization plan for the Metropolitan Street Railway of New York on April 18, testimony was offered by Prof. Mortimer E. Cooley and Prof. Dugald C. Jackson. Their testimony related to the exhibits offered by Ford, Bacon & Davis concerning the value of the property, which were published in last week's issue.

TESTIMONY OF PROF. M. E. COOLEY

Prof. Mortimer E. Cooley, dean of the department of engineering, University of Michigan, testified that as a whole the report, showing a cost of reproduction of the Metropolitan Street Railway of \$102,000,000, exclusive of some items, impressed him as being conservative. The allowance of 8.8 per cent for incidentals was lower than that which he was accustomed to use. He divided this item into two parts, one for incidentals of construction and the other for incidentals of contingencies or inventory omissions. The allowance for incidentals in uncompleted inventories was about 1½ per cent, and ordinarily he should not think of using less than 5 per cent. In the appraisal for the Michigan Railroad Commission of the steam and hydroelectric plants of the State, on which he had been engaged since last July, the work was done from inventories and without access to the actual records of construction costs. Almost invariably these costs, when he had access to them afterward, proved to be greater than the inventory results. He would not think of allowing less than 10 per cent for the total incidentals, and he was not sure but that more would be permissible, especially under the conditions which existed in New York. The allowance of 10 per cent for general contractor's profit was an average figure, but to the extent to which subcontractors' profits were omitted the appraisal was lower than it ought to be. The estimate of 10 per cent would be based on the theory of cost and percentage and it would not be fair to allow only that percentage if the contractor assumed the hazard on a lump bid.

The allowance of 5 per cent for engineering, Professor Cooley thought, was not unfair. He had used from 4 to 8 per cent. It would not be safe to allow less than 5 per cent. He had rarely found steam piping in power plants to be valued at more than one-half or two-thirds of its actual value. An allowance which equaled 10 per cent of the total involved for interest and taxes during construction seemed low. The usual method of providing capital was an arrangement whereby the money was secured in advance by the sale of securities on which interest had to be paid during the construction period.

Professor Cooley disagreed with the assumption that the power plant might be completed for operation in two years. He should not want to think of less than three or four years and would not be surprised if it took longer. Assuming that the period of construction of the entire property was five years from the time the contracts were let until the last line went into operation, the sum of \$7,300,000 would not be excessive for interest during construction and taxes. It would take, however, eight or ten years to complete such a system.

In testifying in regard to development expenses Professor Cooley eliminated some items with which he was not familiar and which appeared to be due to local conditions. He omitted from consideration the property owners' consents and initial payment for franchise and trackage rights, amounting to about \$7,400,000.

Under the head of organization and legal expense there were items amounting to a little less than 4 per cent of the cost of the property. In the experience of Professor Cooley these had run from 4 to 6 per cent. The same comments which he made regarding interest during construction applied to interest during development. The other items in the development period might be charged to the cost of financing, \$3,733,000, which appeared to be a little less than 4 per cent. He thought that the appraisal had been conservatively prepared.

Professor Cooley, in discussing the subject of discount on bonds, said he thought that it was rather favorable to the public to capitalize the discount, but he should prefer to write it off through a sinking fund that would redeem bonds in a certain time. If it were possible he should prefer to pay the discount and expenses connected with the bonds during the life of the bonds.

After a new property was used its physical condition might stand between 75 and 90 per cent and it could never again go to the condition at which it started. There was some point around, say, 15 or 20 per cent below the cost of reproducing the physical elements new at which the property would be maintained throughout its life and at which it would earn the full value which the property was capable of earning. It would earn more in this condition than when it was new, because the new machine had to be "shaken down" before it could perform its duty most efficiently. In the question of value of a property, what was called the present value was of no use except as a factor to show the physical condition. It had not anything to do with the value of the property as an earning proposition any more than that if it was said that if the property was maintained at 70 per cent of its cost to reproduce new, it was going down and was probably below a point at which it could work effectively and efficiently. On the other hand, if the property was maintained to run about 90 per cent the probabilities were that elements were thrown out before they were worn out and when they still had good life left in them. Ordinarily the management should aim to maintain the property at, say, 85 per cent.

In the valuation of the Michigan steam railroads all that was taken out for depreciation was restored by consideration of the properties as going concerns, capable of earning. If a property was maintained and operated properly and was suitable to meet the requirements it would maintain its full value by development of a going value. It often cost a good deal of money to develop the going value. With a new property several years would be required before all of the different elements were brought into harmony. Ordinarily a new property did not earn enough to meet this expense and the money borrowed therefor was the cost of procuring a going value.

Steam railroad properties would average about 80 to 81 per cent of the cost to reproduce new, but electrical properties involving copper, which did not depreciate and cost large sums of money, would run toward 90 per cent.

In answer to a question by Commissioner Maltbie, Professor Cooley said that the value of a going concern was represented by the sum of money which would express the difference between the dynamic and the static condition of the property.

The going value would run from 5 to 15 per cent, or possibly more, but no definite limit could be put. The value of the going concern was equal at least to what it would cost a new company to take the place of the present company in excess of its earnings up to the time when the lines of gross earnings crossed.

TESTIMONY OF PROF. D. C. JACKSON

Prof. Dugald C. Jackson, of D. C. & William B. Jackson, Boston, testified that the incidentals in the estimate of the cost of reproduction were probably less than an actual construction would produce. He would expect these costs to be more than the 8.8 per cent estimated, and probably more than 10 per cent. If a contract of this magnitude were let at cost, plus percentage, the general contractor would probably get 10 per cent. If the general contractor were expected to estimate and to live upon his proposition he would probably include 15 or 20 per cent as his estimated profit. The amount which would come to the general contractor on cost plus percentage, included a large part of administrative expenses, and the like, such as maintenance of his force and plant and the contractor was fortunate if he got four-tenths of the 10 per cent for his own good. If the contractor bore all responsibilities and the possibilities of loss by making a lump sum bid originally, he ought to have an even 10 per cent or even more actual profit. The contractor would expect to let sub-

contracts for as much as could be handled advantageously in that way, and would expect his 10 per cent to apply upon the sub-contractors' prices.

The cost of engineering would be fully as much as the 5 per cent estimated and probably more. The cost of engineering of the Boston Transit Commission for the East Boston tunnel, taking the cost down to and including contractors' profit as the denominator, was 7 per cent. The general expenses, which were the administrative expenses of the commission and the commissioners' salaries, amounted to 6.1 per cent, and the interest paid during construction on the bonds and indebtedness was 9.4 per cent. The cost in this case was \$3,200,000. In the case of the Tremont Street subway, Boston, the cost of which was \$4,400,000, the engineering percentage was larger. In the case of the Washington Street tunnel, Boston, which cost \$8,000,000, the engineer's office expenses were 6.1 per cent, the commissioners' administrative and salary and like expenses were 3.2 per cent and the interest during construction was 9.7 per cent. Professor Jackson spoke of the thoroughness of the plans made by the Public Service Commission for the proposed triborough system in New York. Commissioner Maltbie said that the cost of preparing those plans was less than 1 per cent on the estimated cost of the work to be done.

Professor Jackson said that when the plans had been put into execution and the expenses of resident engineers paid and all the work completed it would probably be found that the cost was 5 per cent.

Commissioner Maltbie said that these were only the preliminary plans and that the large expense would arise when the engineers prepared the working drawings.

The allowance in the estimate for interest and taxes during construction appeared to Professor Jackson to be reasonable. The estimate of five years as the possible time of construction in a work of such magnitude was a bit pessimistic, especially if operation of parts of the plant should be carried on while the construction of other parts proceeded.

There was a state of affairs in an operating plant which had been under operation and had "settled down to the collar" that made it more valuable than a new plant. This added an element of value that did not exist in a new plant. A good deal of expense went into a plant to bring about this condition. Capitalists who desired to invest in a plant preferred to purchase a well-organized, well-moving property operating with certain fixed rates rather than a perfectly new one.

Professor Jackson did not use the phrase "going concern," because it had had so many definitions at different times, but it was perfectly obvious that there was a value. The process of "ironing out the creases" enabled a property to serve its customers better, to do more business for a given annual expenditure, and, with the same investment, to get greater gross earnings and greater net earnings with the same rate.

The hearing was then adjourned until April 24.

A CONSCIENCE LETTER

The following letter was received recently by Edgar S. Fassett, general manager United Traction Company of Albany:

"A short time ago I was on a Red line Car Soth bound, and as the Car got about to 2th St N. End it left the track and I was thrown off the seat and was shaken up quite bad, your clame agent come to see me and we come to a settlement of \$200 I wasent hurt as much as I made ought to be but the money is gone and I have no way of fixing the thing now but the Lord has saved me from all sin and I felt it my place to confess this to you.

"And I this ladyes husband worked on the cars some time before that, and I took several Springs ought of them lamps in the cars for candels and me and my wife has had several rides on the cars that we didnt pay for and I keep a cupple of those little locks of from the redesters and used my passes on the**** line after I was discharged, but the Lord has forgived me for all this and I hope you will forgive us for all our rong duings toward you and the Company."

COMMUNICATION

REWORKING SCRAP

NEW YORK CITY, April 18, 1911.

To the Editors:

The editorial on "Reclaiming and Reworking Scrap" in the *ELECTRIC RAILWAY JOURNAL*, issue of April 8, 1911, gives timely emphasis to the importance of "camping on the scrap pile," for conservation of waste material is one of the fundamental principles of scientific management toward which so many traction executives are turning in their efforts to find a solution for the ever-insistent problem of preserving the balance between disappearing profits and increasing expenses.

The writer does not wish in any degree to depreciate the significance of the scrap pile, but there is perhaps opportunity here for directing attention to one phase of the matter sometimes overlooked, namely, the possibility of overdoing the thing. In other words, there is a nice distinction between economical reclamation of scrap and unprofitable "tinkering" of partly worn material and parts. This calls for thorough supervision and accurate check as to the cost of redeeming the salvage, including all proper charges, otherwise there is opportunity for spending more in repairing a given article than it could be purchased for new—and still having a second-hand article.

An important city traction company recently instituted an analysis of its shop expenses with results somewhat startling to all concerned. One specific result was that, much to the surprise of everyone, and to that of the master mechanic most of all, the shop cost of reclaiming bolts, including cleaning, re-threading, fitting nuts and dipping, was found to be one-third greater than the price which the purchasing department was paying for new bolts of identical size and grade. The natural comment on this statement will be, "There must have been something radically wrong." Obviously so, but it was a condition that actually existed nevertheless. If adequate percentage to cover overhead expense had been added, the discrepancy would have been even more evident. Needless to say, a thorough revision of the method of treating scrap bolts in these shops was immediately instituted.

The moral of this is manifestly not to discourage a watch on the scrap, but that there should be intelligent supervision first over the decision as to what shall be reclaimed, and, second, as to the methods and cost of doing the work.

As a rule the scrap which accumulates on an electric road is much more diversified than that on a steam road. That is to say, there are more grades of scrap, but the quantity of any one grade is less. This fact would probably deter, for instance, the average electric road from going to the extreme cited in the editorial referred to in the case of the Illinois Central Railroad, whose reclaiming department built a small re-rolling mill for reclaiming scrap iron. Few electric roads would regularly accumulate sufficient iron to make such an investment profitable.

To illustrate the need of a thorough analysis of all the conditions in connection with the reclamation of waste material there is room for argument as to the economy of working over paint skins and slops in a street railway paint shop. The writer knows of a repair plant where formerly this was done, but the practice was discontinued, partly on account of the cost of obtaining a suitable mixture and partly because of the limited opportunity for utilizing the inferior paint thus obtained. The idea was to use it in painting car floors and trucks, but the management decided that the artistic effects secured did not come up to the company's rather high standard of attractive appearing rolling stock, and decided that the small saving in salvage paint over new mixtures was not worth the effort. A steam road that could use paint leavings on freight cars, for instance, or an electric road differently situated might reach an entirely different decision.

The importance of corraling all scrap, of carefully safeguarding it against theft and of securing accurate accounting and credits can hardly be overestimated. A practical method

of handling is to assign to one man the responsibility of supervision over scrap. All of the returned material from shops, carhouses, track and electrical work so far as possible should be brought to one central point daily and should be intelligently sorted and classified. The man in charge must be competent to decide what is to be reclaimed by repairing or reworking and what can more advantageously be disposed of as scrap. If reclamation is decided upon the repairs should be made only on a job or work order, properly approved, in order to obtain an accurate check on the cost. In this work the material should be charged at scrap value, to which should be added the cost of any new material used, all labor involved and a percentage for non-productive or overhead expense. This record should be compared with prevailing prices for similar articles new. Anything short of this procedure is apt to lead to that most unprofitable sin, deceiving oneself.

After the redeemable material has been sorted out the scrap metals should be classified in bins as to bare copper, insulated copper, brass, steel, heavy melting, malleable, spring, etc. The cost of this extra handling will be far more than compensated by the higher quotations obtainable for sorted metals than for mixed.

Instead of attempting to hold accumulations of scrap metals for favorable market with the intention of selling only when quotations are high, several progressive traction companies are handling this matter on an annual contract basis. That is, a contract is made with a responsible bidder to take all the scrap metal the company has to offer for a year, deliveries to be made once or twice a month and the price to be based on current quotations at the time of delivery. For instance, on scrap copper the bid might be made and the contract accepted on the basis of 1½ cents under the prevailing market quotations as published in some accepted authority. Then if in a given month the quotation for lake copper was 14 cents, all the scrap copper delivered during that month would be sold at 12½ cents.

This plan offers several advantages. Few electric roads are equipped for storing accumulations of scrap under proper safeguards and the material is apt to litter up yards and store-rooms. When the accumulation extends over several months the accounting is not always accurate, and monthly statements of operating expenses are distorted. Under the contract plan all scrap is listed once or twice a month and notice to the scrap firm of this list acts automatically as a bill of sale against which invoice is made at once without further correspondence, thereby getting the credits into the corresponding month's account. The safeguarding and removal of the scrap are then up to the contractor. The only objection that can be brought against this method of handling is that scrap is sometimes sold on a low market, but the answer to this is that the results average themselves. Moreover, when attempt is made to "follow the market" and sell only at high quotations, the records show that in the long run there are enough losses to balance the profits. The greater advantages are all in favor of the contract plan.

SUBSCRIBER.

A NEW CARHOUSE

The Public Service Railway, Newark, N. J., in the near future will build a combination railway station, carhouse and shops to be located on Washington Avenue, Nutley, N. J. The carhouse will be 53 ft. x 442 ft. and will have a capacity for 40 cars. The shops will be 53 ft. x 466 ft., of which 60 ft. of depth will be used as offices. The second floor of the building will be used by the employees as a large assembly hall, to which will be connected a banquet room, smoking room and dressing rooms. The building will be of brick, steel and concrete, will be equipped with rolling steel doors and will be arranged for double-end operation. It will be built 70 ft. back from the street with a loop on which cars can be turned. From this loop tracks will be run to the side of the building, where there will be open storage room for 80 cars. The site is on such a grade that it will necessitate the building of a retaining wall.

MEETING OF COMMITTEE ON CONSTRUCTION OF SCHEDULES AND TIMETABLES

The committee on construction of schedules and timetables of the Transportation & Traffic Association held a meeting at the office of the association in New York on April 24 and 25. Those present were N. W. Bolen, Public Service Railway, chairman; I. H. McEwen, Oneida Railway; Alexander Jackson, Public Service Railway; F. L. Hubbard, Toronto Railway; Timothy Connell, Boston Elevated Railway, and H. C. Donecker, secretary of the association.

The first subject taken up was the standard form of working timetables for interurban roads. Mr. McEwen presented for consideration a number of questions designed to bring about a discussion on the most important features of such a timetable. He had submitted these questions in advance of the meeting to two other members of the committee, Frank I. Hardy, Fort Wayne & Northern Indiana Traction Company, and J. J. Doyle, Washington, Baltimore & Annapolis Electric Railway. Neither of these gentlemen was able to attend the meeting, but both sent letters replying to Mr. McEwen's questions.

Mr. Donecker suggested that the new code of interurban rules which is to be presented at the convention this year be examined before proceeding with recommendations for a standard form of timetable. J. W. Brown, chairman of the interurban rules committee, was thereupon invited to enter the meeting. Mr. McEwen pointed out several inconsistencies and inaccuracies in the wording of rules relating to timetables in the 1909 Denver code, but Mr. Brown explained that most of those to which Mr. McEwen referred had been corrected by the interurban rules committee this year. Attention would be given to those rules in which such inaccuracies had not been discovered before.

The committee then took up the replies to questions contained in the 1910 data sheet relating to interurban schedules and timetables. This information was not included in the report of the committee last year. Some of these data will be included in the report in the form of a table for general information only. This table will include statistics of mileage, car miles per day, average number of cars operated, average speed of local and limited cars and maximum free-running speed. A summary of the answers to other questions will be made a part of the report.

A proposed standard form of working timetable was considered next. It was decided to recommend the use of a single sheet folded in convenient form in preference to a book form with timetables on separate sheets. The proposed standard form for single-track roads is a single sheet with the timetable printed on one side and special instructions on the reverse side. This sheet is 6 in. deep and from 24 in. to 30 in. long, with from four to five folds so as to make it fold to a size, 3 in. x 6 in., which can be slipped easily into a trainman's coat or vest pocket. The list of stations is printed in the center, with the timetables of trains in opposite directions on each side. The sheet is folded so as to open in the center to the list of stations. The columns in which the times of trains are printed are ½ in. wide, so that from twenty-two to twenty-eight trains in each direction can be shown on the single sheet. When it is necessary to show a larger number of trains the length of the sheet and the number of folds can be increased and the list of stations can be repeated on each end for convenience in reading. The title is printed on the first page as folded. Where regular meets are shown by continuous rows of black-face figures guide lines are inserted half way between such rows, and where the meets are irregular guide lines are inserted between every fifth and sixth line. For double-track roads the same form of folded sheet can be used by folding it once across and printing the time of trains in opposite directions on the two exposed faces. The special instructions can be printed on the next to the last page as folded.

The committee agreed that where second-class trains are

operated the time of such trains in at least one direction should be included in the timetable in order to insure safety and reduce the number of train orders which would have to be issued if all such trains were operated in both directions as extras. The time of trains of inferior class should be shown in columns at the extreme end of the timetable and should be separated from the time of first-class trains by a heavy rule. When the stations are shown in a single column in the center of timetable the time of trains in one direction should read down and in the opposite direction read up. Where separate tables are used for trains running in opposite directions on double track, and the stations are repeated in each table, they should be arranged in each case so that the time will read down.

The distances between each station and the two division terminals should be included in working timetables in separate columns on each side of the list of stations. It was agreed that it was not necessary to give the distance between adjacent stations. All distances should be shown in decimal hundredths of a mile.

The committee was divided on the advisability of adhering to even-hour schedules without regard to the traffic or the "lay-over" time required for such schedules. It will call attention in its report to the advantages from an operating and revenue standpoint of adjusting the leaving time of trains to volume of traffic at different hours and to the local conditions of running time, "lay-over" time, etc. On the other hand, the committee recognizes the convenience to the public of hourly schedules and the difficulty of making changes where this practice has been established for a long time.

Where the cars of one company operate over the tracks of another company the time of such cars on foreign lines is to be shown on the working timetable in italics for information only. With regard to showing Sunday or Saturday and Sunday trains on the timetable where the service on these days varies from the regular week-day service, it was decided to recommend that such trains should be shown on the timetable in their proper order of leaving time, with explanatory headings in the columns, such as "Sunday Only." The use of typographical symbols to indicate such trains on the working timetable was not approved.

The next question was the method of numbering trains. The committee decided to recommend that odd numbers be used for northbound and westbound trains and even numbers for eastbound and southbound trains, as this corresponds with the usual practice of the steam railroads. The first train out after midnight should be numbered 1 westbound and 2 eastbound, and succeeding trains should be given higher numbers in the order of their leaving time from the terminal. If there is a probability of adding trains in the future, blanks may be left in the proper places for numbering such trains. Trains operating over different divisions from the same terminal may be given numbers beginning with different hundreds. Second-class trains should be given numbers of three figures to distinguish them from first-class trains.

The committee intends to prepare a sample of the proposed standard timetable embodying all of its recommendations.

DEFINITIONS

The committee formulated the following definitions of terms used in making up schedules and timetables for city operation:

Patch.—A substitute for a portion of the timetable in effect, applied in such a way as to cover parts of the timetable, for the purpose of increasing or decreasing the service.

Run.—A group of trips shown on a timetable, which constitutes a day's work for a car crew.

Run Number.—An arbitrary number assigned to a run.

Run Guide.—An index of the time on and time off and the total working time of each run shown on a timetable.

Train Number.—An arbitrary number or a symbol used to designate a given trip or group of trips.

Assignment Sheet.—An index of the names of the car crew assigned to each run.

MEETING OF THE COMMITTEE ON EDUCATION OF AMERICAN ELECTRIC RAILWAY ASSOCIATION

A meeting of the committee on education of the American Electric Railway Association was held at 29 West Thirty-ninth Street, New York, N. Y., April 22. Prof. H. H. Norris, of Cornell University, and Prof. A. S. Richey, of Worcester Polytechnic Institute, were present. In addition W. G. Gove and C. E. Roehl, of the Brooklyn Rapid Transit Company, and H. A. Benedict, of the Public Service Railway, were in attendance upon invitation.

Professor Norris outlined the plans of the committee on education this year, which are to conduct a course of instruction for the benefit of a number of young men in the employ of several of the member companies which have agreed to bear the expenses of this course of instruction. Up to this time three companies have definitely agreed to designate five men each to participate in the plan, and at least one, and possibly two, other companies are expected to do the same before May 1, when instruction will begin. This will give at least fifteen students, or a maximum of twenty-five. For this service each company will pledge itself to the payment of \$150 to cover actual expenses of instruction.

Professor Norris said that the object of the committee on education this year was to determine the practical value of a course of this kind. If the methods to be followed were based on correct principles of pedagogy, and if the results secured were what the committee hopes and expects, it would be possible in another year to enlarge the field if the association should look favorably upon such a proposal. If conducted on a larger scale the expense per pupil would be very much less. Professor Norris said that if any such permanent arrangement should be made he believed it would be very desirable that the individual men receiving instruction should personally defray at least a part of the expense. His experience in teaching had indicated to him that any instruction secured without some direct or indirect sacrifice on the part of the student was not regarded by him as highly as it would otherwise be and that he did not have the same incentive or receive as much benefit as if he paid directly or indirectly for the instruction. The benefit of the proposed plan to the company came from the development of a more efficient set of men. The plan could, in a sense, be regarded as supplementary to the apprenticeship courses conducted by a number of companies.

The plan to be followed is as follows: Each company will first select from among its young employees in mechanical, electrical or steam work a certain number, say, fifteen or twenty, as candidates for the course. These men, or boys, are not to be technical graduates, but preferably should have had a good grammar-school or high-school education and should be from seventeen to twenty-one years of age so as to be adaptable and not too far removed from the "school age." Each candidate will then prepare on forms which will be furnished to the participating companies by the committee a statement giving his experience, names of his previous employers, if any, and the work at which he has been engaged. From these reports the company, or the committee on education, will select from each company five men to receive the course of instruction.

As soon as possible after the formation of the several groups each class will be addressed by a member or a representative of the committee, who will outline the purpose of the course and explain to the men what is expected of them. Each student will then be assigned to some subject upon which he is to prepare a report within a definite time, say, one week. The subject selected will be connected with the work upon which he has just been engaged. If, for instance, he has been at work repairing some type of motor, he may be asked to submit a report on the construction of the armature of that motor, or upon its brush holders, or upon some other part of the motor, and he is expected to look up his own sources of information. These may be the technical papers, textbooks or manufacturers' catalogs, or the student may obtain his information from the

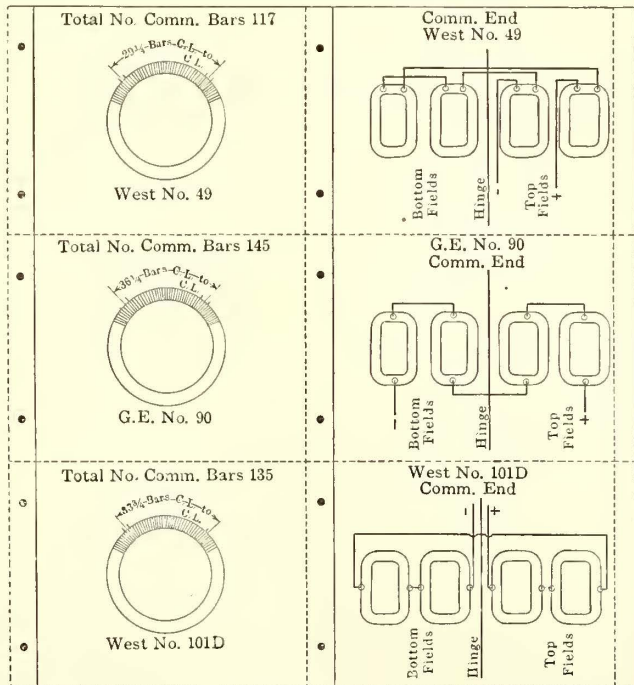
foreman of the shop. These reports will be sent to the committee in care of the New York office of the association. When received they will be corrected, the errors will be explained to the students and the latter will be told to revise their reports and submit final drafts to the main office. Here they will be kept on file so that members of the committee, officers of the co-operating companies or others interested in the plan can inspect them at any time. It is expected that reports will be required of students about once a week. At any time any student has the privilege of applying to the committee for information.

The main object of the instruction is to wake up the boys and encourage them to use their brains on the work they are doing. If any student shows that he is not taking enough interest in the work, or is incapable of benefiting from it, he will be dropped and the expense of instruction to the company employing him will be reduced in proportion. The committee expects that in addition to this instruction by correspondence each group of boys will be met by a member or representative of the committee several times during the period of instruction. The course will continue until about Sept. 1, so that the committee will be able to report upon the results at the October convention of the association.

In general, the plan outlined is somewhat similar to that of the American Gas Institute, which conducts a course of instruction on the construction and use of gas appliances for the benefit of employees of member companies of the institute. The course of the Gas Institute, however, corresponds more closely to that of the correspondence schools than that proposed by the Electric Railway Association, because printed questions are used, whereas in the electric railway course no general form of questions and answers will be employed, but each student will be sent special topics and must investigate them independently.

BALTIMORE INSTRUCTION PRINTS

Employees of the car maintenance shops of the United Railways & Electric Company, of Baltimore, are furnished with instruction prints prepared under the direction of A. T. Clark,



Baltimore Instruction Prints

superintendent of rolling stock and shops. A recent group of these prints is reproduced in the accompanying drawings, which show the spacing of brushes and the diagrams of field connections on Westinghouse No. 49, GE-90 and Westinghouse No. 101-D motors. These prints are made up into books from sheets about 5 3/4 x 4 1/4 in. in size.

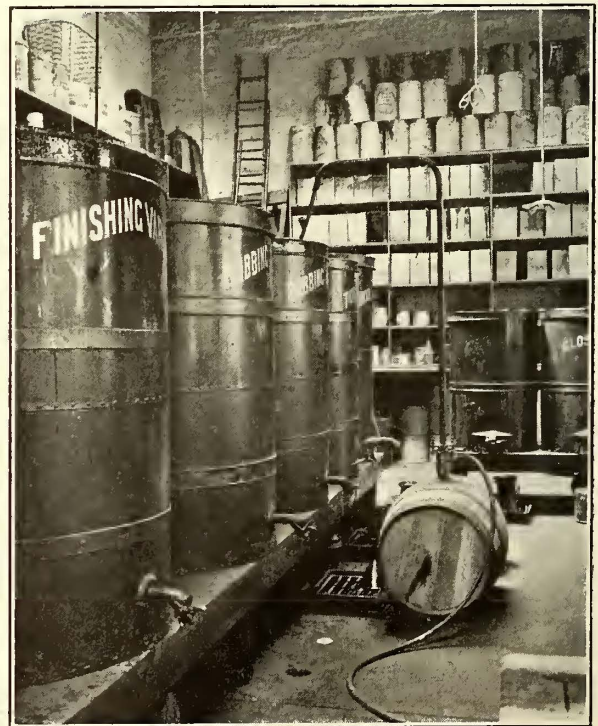
A REMOVABLE SAND HOPPER

As a substitute for a sand hopper under the car seats, the Fishkill (N. Y.) Electric Railway uses a substantial flat-bottom galvanized iron fire pail. In the bottom near the periphery is cut a 2-in. round hole which registers with a cast-iron mouth-piece fastened on the bottom with stone bolts. This mouth-piece fits into the pipe leading down through the car floor to the sand valve and track spout. A wooden plug fastened to the pail with a chain is used to close this hole in the bottom and it is withdrawn when the pail is in place over the sand valve. A number of pails filled with sand are kept on hand around the sand-drying stone and when a pail on a car is emptied it is lifted off and replaced by a full pail. The object in attaching the spout eccentrically is to permit the spout to be inserted in the sand valve pipe and then to turn the pail around under the seat where it is out of the way. The steep grades on the lines of the Fishkill Electric Railway make it necessary to use sand on both rails and no failures of this simple device have been recorded.

HANDLING VARNISH BY AIR PRESSURE

The paint stockroom of the Chicago Railways Company makes use of the shop air supply for a number of operations. Among these is the transferring of oil, turpentine and varnish from the barrels in which they are received into large elevated storage tanks.

A barrelful of turpentine or varnish is rolled in front of one of the storage tanks and the plug is knocked out of the bung-hole. Then a special emptying siphon is inserted. This device consists of a cone-shaped collar threaded to fit tightly into the bung-hole. Inside of the brass collar is a piece of 1-in. wrought-iron pipe of such length that one end will reach to the bottom of the barrel and the other extend into the top of the high storage tank. The brass collar around this pipe includes a gasket so that when tightened in place the barrel is easily put

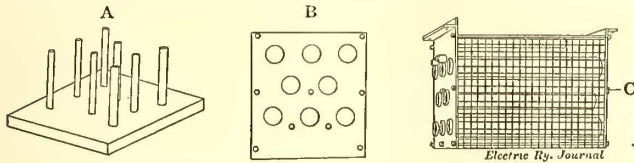


Handling Varnish by Air Pressure

under pressure by attaching a hose to a connection in the side of the brass collar. The shop air pressure is reduced to 10 lb. for this use. With this device the following time is required to transfer a barrel of new material into one of the elevated storage tanks: Turpentine, three minutes; oil, seven minutes; varnish, eight or nine minutes.

A STAND FOR HEADLIGHT RESISTANCE COILS

The stand shown in the accompanying sketches will be found very helpful in repairing the Crouse Hinds headlight resistance coils, when it is necessary to repair broken wire or to replace broken tubes. Any one accustomed to repairing this resistance will find that after either end plate is removed the tubes will fall together and it is very difficult to replace them in their proper places. The base of this stand is an inch board 8 in.

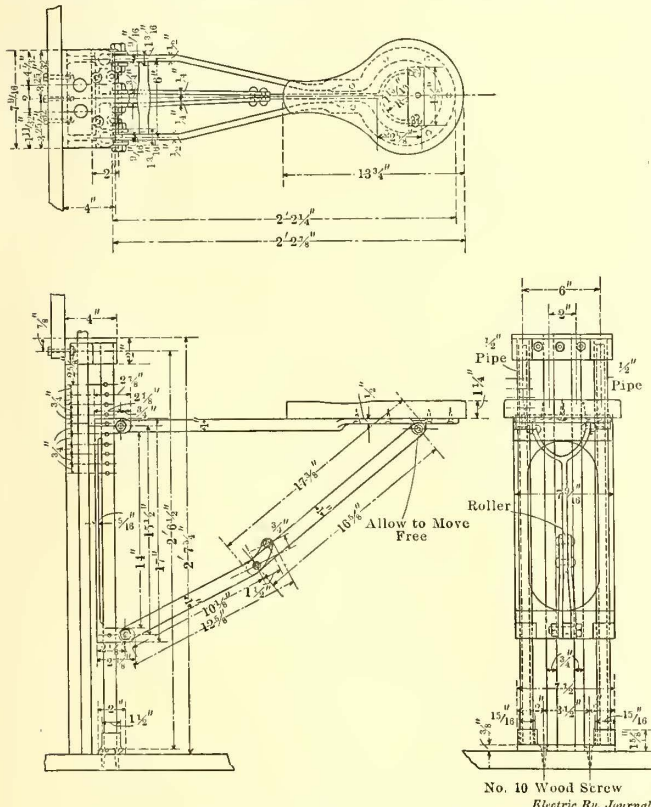


Repair Stand for Headlight Resistance Coils

x 8 in. in size, with 1/2-in. holes laid off to correspond to the holes in the end plate "B." One-half-inch pins are made 4-in. long, and these are driven into the holes in the base-board. When the resistance is to be taken apart the center rod "C" is reversed so the nut will be on the other end. The other rods are taken out and the resistance placed on the stand, then the nut on the center rod is removed. It will be found that the stand will hold the tubes apart in their respective positions, whereupon the repairs can be easily made. By making two of the stands, the resistance can be inverted and the other end plate also removed.

MOTORMAN'S SEAT IN PHILADELPHIA

The Philadelphia Rapid Transit Company is making arrangements to equip all of its air-brake cars with folding seats for the use of the motormen. The constructional features and dimensions of this malleable-iron seat are shown in the ac-

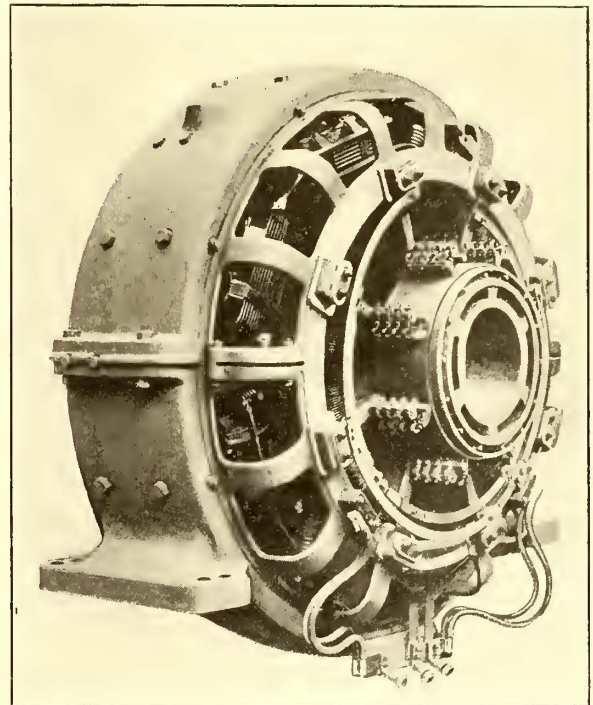


Construction Details of Folding Seat for Motormen

company drawing. The cost of this seat is about \$1.75 for labor and material. The management was desirous of equipping all of its cars with similar seats, but their installation on the hand-brake cars was not practicable since they would have prevented the motormen from operating the brake-spindle effectively.

INTERPOLE GENERATORS FROM 25-KW TO 1000-KW CAPACITY

The Westinghouse Electric & Manufacturing Company has brought out a new line of d.c. interpole generators known as type "Q." The interpole construction is said to provide perfect commutation, with a definite brush position covering all ranges of load. Heavy overloads may be imposed without sparking or flashing, and wear on commutators and brushes is reduced to a minimum. The frames are of cast steel, a material of high magnetic permeability. The rotors or armatures are designed for direct mounting on the shaft of the prime mover. The stators or fields are arranged for mounting on masonry foundations or directly on the bedplate of the prime mover. Ventilation has received particular attention. The design of all the windings is such as to give shallow coils, with the result that the heat in any part has but a very short distance to travel to



Direct-Current Interpole Generator for Ratings from 25 kw to 1000 kw

the surface from which it is radiated. This, with a thorough system of air circulation, is said to insure an entire absence of hot spots.

These generators are standardized for desirable and usual ratings from 25 kw to 1000 kw, with speeds conforming to the best engine practice. Up to 100 kw in capacity the standard potentials are 125 volts or 250 volts. From 100 kw to 300 kw these machines are also wound for 600 volts; from 300 kw to 1000 kw they are wound for 250 volts and 600 volts. Machines of 250-volt rating are regularly equipped for three-wire operation.

The interpoles have their windings in series with the armature and set up a magnetic field which annuls the effect of the field formed by armature magnetization and generates in the commutated coil an emf which assists the reversal of the current. Since the interpole coils are in series with the armature the interpole field strength varies in proportion to the load and it thus has the proper corrective effect at all loads. Since the emf due to the interpole, which assists reversal, has a definite position under the interpole, the coil which is being reversed must be located accurately with respect to this reversing emf. Therefore the correct position of the brushes must be determined exactly before the generator is put into service. When this point has been properly located shifting the brush position is not only unnecessary but detrimental.

News of Electric Railways

Formal Subway Offer from Brooklyn Rapid Transit Company

The Brooklyn Rapid Transit Company formally presented its subway offer to the city of New York on April 25, 1911, in a letter to Borough President George McAneny, who is chairman of the transit committee of the Board of Estimate, and William R. Willcox, chairman of the Public Service Commission. The letter shows the result of the conferences that followed the submission of its offer of March 2, 1911. It includes the operation of the Broadway-Lexington Avenue subway in Manhattan and its extensions in the Bronx, with the subway and elevated extensions in Brooklyn, Manhattan and Queens, covered in the earlier proposition, and establishes a 5-cent fare in all boroughs, except to Coney Island, but includes a possible extension under the Narrows to Richmond.

The company proposes to spend \$75,000,000 of its own capital in extending its elevated lines, connecting its old steam surface lines in South Brooklyn and Flatbush with the proposed new subways and equipping the new subways and elevated for operation. It estimates the maximum financial requirement for the city at \$83,500,000. This, however, is based on the large tube originally planned for the triborough subway. On a reduced bore the proposed use of the city's credit is reduced to \$73,500,000.

The company points the way to a further reduction of \$19,000,000 in the requirement for immediate employment of municipal bonds, by offering to build the Broadway subway from Ninth Street to Fifty-ninth Street and across to the Queensboro Bridge for \$5,000,000, if the city decides to adhere to the original extensions of the Fourth Avenue subway to Fort Hamilton and Coney Island. On July 1, 1911, the letter declares, the city will have \$80,000,000 available for subway construction.

At a conference with the members of the Public Service Commission on April 25, 1911, Col. Timothy S. Williams, president of the Brooklyn Rapid Transit Company, assured Mr. Willcox that the company had arranged through Anthony N. Brady, who is chairman of its executive committee, to finance the needs of the company.

In concluding its formal offer the company said:

"The adoption of the plan which we have outlined presents a comprehensive scheme of transportation reaching every borough of Greater New York and capable of indefinite expansion without unnecessary duplication of capital. It permits the realization within a few years, instead of within a generation, of a unified city transit system with through cars and a single fare. It is the only plan before the authorities which gives assurance of return on the \$30,000,000 of city capital already invested or contracted for in the Centre Street and Fourth Avenue subways. It is the only plan which assures the city interest and sinking fund requirements on municipal investment in subway construction, past, pending and now proposed, with equal participation in additional profits which are not problematical but probable. It is the only plan which insures financial return to the city from the growth, not merely of lines embraced in new franchises now to be granted, but of 67 miles of existing rapid transit routes doing a large volume of business. It is the only plan which guarantees to the city an operator of future extensions, whether offering promise of profit or not, under conditions which insure the most economical operation, create no additional fares, and offer the maximum facilities for public convenience. It is the only plan which furnishes a complete trunk system from which branches may be extended according to transportation needs, symmetrically and efficiently. Each borough might by some local or less comprehensive plan get lines of rapid transit—but unless these are connected up and operated with such a widely extended trunk system as we have proposed their usefulness would be comparatively slight, and the fares for transportation would be doubled or trebled. Equal advantages under any other plan could not be obtained with twice the expenditure of city or private capital."

The Philadelphia Loan

The finance committee of the Councils of Philadelphia was to confer during the week commencing on April 24, 1911, with Charles O. Kruger, president of the Philadelphia Rapid Transit Company, and Ellis Ames Ballard, general counsel of the company, in regard to the \$10,000,000 loan which it is desired to negotiate in order to rehabilitate the physical property of the company. The special committee requested a statement more in detail than the original one submitted by T. E. Mitten to E. T. Stotesbury as to the disposition of the proceeds of the loan, and a statement in accordance with the request for more specific information was submitted, as noted in the *ELECTRIC RAILWAY JOURNAL* of April 22, 1911, page 711. There seems to be a division of opinion among the Councilmen in regard to the method of procedure. The charge was even made that action on the loan was being needlessly delayed. J. R. C. McAllister, chairman of the finance committee of Councils, which has the matter in hand, is reported to have said:

"There is no delay. We are waiting for the corporation to give us further information. I do not say that we have asked for it, but it seems to me that there should be more told that would enlighten the public concerning the expenditure of the loan money. I am not in favor of passing this ordinance without incorporating into it specifically the items given by Mr. Stotesbury. On the contrary, I insist that a contract between a corporation and the municipality should be as specific and as binding as a contract between an individual and a corporation. Unless this idea is carried out in the ordinance I will oppose it."

George McCurdy, president of Common Council, expressed the opinion that incorporating in the measure specific provisions that the \$10,000,000 shall be spent in any certain way in rehabilitating the system would cause capital to hesitate to buy the bonds. He is reported to have said:

"At the recent meeting of the finance committee I was on the point of offering the motion that the loan be favorably reported when Mr. Seger made the motion that the correspondence connected with the negotiations be printed. I cannot help feeling that if it is insisted that the moneys to be expended are to be specified item by item in the ordinance Mr. Stotesbury will have difficulty in marketing the bonds. If the bonds could not be marketed by Mr. Stotesbury the last state of the company would be worse than the first. The company needs to be rehabilitated and I think the Councils should take Mr. Stotesbury at his word. The company is now in such a position that if Councils do not pave the way for the Stotesbury rehabilitation we shall run the risk of being plunged into a condition that will be worse than anything we have ever yet experienced. By this I mean that if the company should be disintegrated we would be compelled to pay, instead of 5-cent fares, as high as 15 cents to travel ordinary distances."

Several letters have passed recently between Mr. Kruger and Peter Driscoll and H. B. Barron, who represent the employees whose request for an increase in wages to 28 cents an hour was made recently. Under date of April 19, 1911, Mr. Kruger addressed a letter to the representatives of the men in which he quoted the terms under which the men returned to work following the strike of February, 1910, the concession of the company in agreeing to pay the men who returned under the provisions of the strike settlement \$2 a day until they were assigned to regular runs, and the pension and death benefit funds of the company. Mr. Kruger said that the company in carrying out the understanding with the men in regard to paying the men until they were assigned to permanent runs had paid out \$123,192 and that the company is now paying the men so unemployed a sum averaging \$3,000 a month. He concluded his letter as follows:

"Taking into consideration the advance promised by the company's published announcement and effective July 1 next, the wages now paid are quite all that the company's earnings will support, and as bearing upon the desirability of the employment it may be said that there is an over-

supply of competent men now seeking employment with the company at these wages."

A meeting of the men to consider the reply by Mr. Kruger will be held on April 27, 1911.

The New Jersey Employers' Liability Law

The Edge employers' liability law, passed by the New Jersey Legislature and signed by Governor Woodrow Wilson, as noted in the *ELECTRIC RAILWAY JOURNAL* of April 8, 1911, page 646, is said to be the most comprehensive and sweeping law of the sort enacted by any American commonwealth. The act is to go into effect on July 4, 1911. It is applicable to all classes of employers and workers and provides that compensation for injuries to or for the death of an employee "by accident arising out of and in the course of his employment shall be made by his employer without regard to the negligence of the employee," "in all cases except when the injury is intentionally self-inflicted or when intoxication is the natural and proximate cause of the injury." Under even the rule of exceptions the burden of proof is placed upon the employer. The law would seem to apply to all occupations, the measure stating:

"'Employer' is declared to be synonymous with 'master' and includes natural persons, partnerships and corporations; 'employee' is synonymous with 'servant' and includes all natural persons who perform a service for another for financial consideration, exclusive of casual employment."

A feature of the law is a table of fixed compensations to be awarded. The compensations to be paid to injured employees in case of temporary disability would be 50 per cent of the wages received at the time of the injury—the maximum to be \$1 a week and the minimum \$5. Persons receiving less than \$5 a week are to receive the entire wage, and in all cases of such temporary disability the payment is to be made for the full term of disability not exceeding 300 weeks. For permanent disability the term would be extended to 400 weeks. For some other injuries a schedule follows: For the loss of a hand, 50 per cent of daily wages during 150 weeks; for the loss of an arm, 50 per cent of daily wages during 200 weeks; for the loss of a foot, 50 per cent of daily wages during 125 weeks; for the loss of a leg, 50 per cent of daily wages during 175 weeks; for the loss of an eye, 50 per cent of daily wages during sixty weeks.

The compensation for dependents and next of kin in case of death are to be as follows: Total dependents—If orphans, 50 per cent of wages of deceased; if widow alone, 25 per cent of wages; if widow and one child, 40 per cent of wages; if widow and two children, 45 per cent of wages; if widow and three children, 50 per cent of wages; if widow and four children, 55 per cent of wages; if widow and five children or more, 60 per cent of wages; if widow and father or mother, 50 per cent of wages.

There are also elaborate provisions for dependents and partial dependents not provided for in the foregoing table, and when there are no dependents provision is made for the expenses of the last illness and burial. The compensation ranges from a maximum of \$4,000 for total disability to \$600 for the loss of a thumb. The burden of proof falls upon the employer.

Wilful negligence on the part of the worker is defined as follows:

"For the purposes of this act, wilful negligence shall consist of (1) deliberate act or deliberate failure to act, or (2) such conduct as evidences reckless indifference to safety, or (3) intoxication, operating as the proximate cause of injury."

Progress of Negotiations in Toledo

The attention of Mayor Whitlock and A. E. Lang, president of the Toledo Railways & Light Company, was almost entirely taken up in a discussion of the interurban railway question at the sessions on the franchise extension which were held during the week which ended on April 22, 1911. As a result a tentative agreement has been reached to the effect that the city shall have the right to permit the operation of interurban cars over the tracks of the Toledo Railways & Light Company under such conditions as it may fix if the companies disagree. This is subject to change, however.

At the session on April 18 Mr. Lang pointed out several objections to the Schreiber draft which relate to interurban business. He said that the plan to require the consent of the city to contracts with interurban companies would often stand as a barrier against the construction and entrance of new roads and that the provision that interurban cars should stop for city passengers and carry them between points within the city would make such roads competitors of the local lines. Competition was not sought in these negotiations. His company was prepared to erect an interurban station at a cost of \$250,000, but he felt that it would only be fair in return for this accommodation to leave the company free to deal with the interurban companies.

Mr. Lang objected especially to the provision that all existing contracts between the Toledo Railways & Light Company should be surrendered before the proposed new franchise goes into effect. These contracts were based upon the life of the old franchise, but were renewable with the renewal of the franchise. Mr. Lang considered his company obligated by the contracts. He could not agree to accept any provision that would negative the contracts which his company has with other companies.

It was agreed that the incoming interurban cars should stop to discharge passengers, but that they should not be required to stop on outgoing runs to take on passengers who wished to ride only within the city limits. It was expressly provided in all present contracts that the interurban railways should not become competitors for city business.

A plan to have a line to be used expressly for the entrance of interurban railways was discussed, but later it was found that at least four such lines would be necessary and this was considered out of the question. Mr. Lang said that the local company received no benefit from the 3 cents to 3½ cents per passenger charged the interurban railways for using its lines.

On April 20, 1911, the subject of transfers between the cars of the local company and cars of the interurban companies was opened, but the talk soon reverted to regulation of interurban operation by the city. The Schreiber draft puts all interurban cars upon the same basis as city cars in respect to operation and fares. The requirement about free transfers between local and interurban cars had been incorporated since the original draft was submitted. Mr. Lang said that his company received a certain amount of each fare and that free transfers would prevent it from securing any more.

On April 21, 1911, it was agreed that attorneys for the city should examine the contracts with the interurban railways to give the administration a better understanding of the matter under discussion. Mr. Lang contended that the question of fares to be charged by interurban railways for city passenger service and the provision for the interchange of transfers should be eliminated from the franchise.

Mr. Lang and Attorney Fuller objected to the stipulation that the company should furnish a bond of \$500,000 as a guarantee that the company would perform its obligation under the franchise. Mayor Whitlock proposed to reduce this to \$100,000, but Mr. Lang insisted that \$50,000 would be sufficient.

Michigan United Railways Plans for Development

Having secured an entrance to Detroit some time ago, the Michigan United Railways is said to have concluded negotiations to complete a through passenger and express line between Detroit and Chicago by making the Kalamazoo, Lake Shore & Chicago Railway part of the Michigan United system. The Kalamazoo, Lake Shore & Chicago Railway is a steam road, known as the Fruit Belt Line, and extends from Kalamazoo to South Haven, a distance of 55 miles. It will be extended from South Haven to Benton Harbor, whence a line of steel steamers will connect it with Chicago with a two and one-half-hour service. The plan is to electrify the steam line at once and to continue it in operation until this work is completed. The distance between Benton Harbor and Chicago is 51 miles. Terminal and docking facilities have been arranged at Chicago. The running time between Detroit and Chicago will be about ten hours.

The system now covers the territory between Jackson and Kalamazoo and Jackson and Lansing. Within a short time the new line from Lansing to Owosso will be in operation

and as arrangements have been completed with the Detroit United Railway by which cars of the Michigan United Railways will be operated through Ann Arbor and Ypsilanti to Detroit the company will draw business from nearly all parts of the State. Limited cars will be run between Detroit and Benton Harbor to connect with the boats for Chicago. The express cars will be operated at night. The steam service on the extension will be replaced with the third-rail system.

The Kalamazoo-Jackson division of the Michigan United Railways is 68.4 miles long, 44 miles of which are operated by third-rail. The limited running time from Jackson to Kalamazoo is two hours and twenty minutes. The Jackson-Lansing division is 37 miles long, operated by third-rail, with limited running time of one hour and ten minutes. The Lansing-St. Johns trolley division is 20.5 miles long, all local trains, fifty-five minutes' running time. The Lansing-Owosso division, now very nearly completed, will be operated by the third-rail for the entire 36 miles.

Trade Journals Change Hands.—The Class Journal Company, which publishes the *Automobile* of New York, *Motor Age* of Chicago, *Automobile Trade Directory*, *Official Blue Book* and *Commercial Vehicle*, has been sold, for a consideration of more than \$1,000,000, to the United Publishers Company, New York, N. Y., which controls the *Dry Goods Economist* and the *Iron Age*.

Fender Tests in St. Louis.—The fender tests being conducted by the Board of Public Improvement of the city of St. Louis have been continued during the present week according to the schedule originally mapped out. The devices demonstrated during the week ended April 22 were the Parmenter wheel guard, the H-B universal life guard, the Berg folding fender and the Berg automatic wheel guard. It is expected that the tests will continue until about May 20.

Report of Committee of Cleveland Chamber of Commerce.—The special committee of the Cleveland Chamber of Commerce appointed to consider proposed changes in the Taylor grant is preparing its report. It is expected that the committee will pay special attention to the feature relating to security; that it will advise that this be made as strong as possible under the State laws, and that it will recommend that the city rate of fare be extended to Collinwood, which has been admitted to the city since the grant was made.

Meeting of Society for Promotion of Engineering Education.—The nineteenth annual meeting of the Society for the Promotion of Engineering Education will be held at Pittsburgh, Pa., on June 27, 28 and 29, 1911. The headquarters will be at the Carnegie Technical Schools. At the meeting special attention will be given to the reports of the committees on the teaching of mathematics to engineering students and entrance examinations for technical schools. Particulars regarding the meeting can be obtained from Prof. H. H. Norris, Cornell University, Ithaca, N. Y.

The Defeat of the Sammis Utilities Bill in Iowa.—J. U. Sammis, member of the State Senate of Iowa, has made the following statement in regard to the failure of the Legislature at the recent session to enact the public service bill introduced by him: "My public utilities bill was a creature of unfortunate circumstances. Several members of the Senate who would have voted for the bill were absent at the time it came up. The session was drawing to a close, and there was no time to postpone consideration. But the bill will be brought up again. It is not dead. Many members of the Senate who voted against it considered their decision more as an act to postpone action than as one to kill the bill."

LEGISLATION AFFECTING ELECTRIC RAILWAYS NEW JERSEY

The Legislature of New Jersey adjourned on April 21. The session was remarkable in that all of the reform measures urged by the Governor were enacted. The substitute utilities bill went through at the eleventh hour slightly amended. The principal feature of the measure is that it confers rate-making powers on the commission. Two of the members of the present commission are to be con-

tinued until their terms expire. Prof. W. M. Daniels succeeds F. H. Sommer, the third member. A digest of the new bill is published elsewhere in this issue. The annual appropriation for State expenses is \$6,636,885. The Hudson County subway bill, which provided for the construction of a subway under Hudson Boulevard, was defeated in the Assembly. The Assembly killed the bill to give governing bodies in municipalities the right to grant franchises to electric railways for indeterminate periods with the right to revoke on notice.

PENNSYLVANIA

The first public hearing on the new public service commission bill before the House Judiciary General Committee was held on April 19, 1911. Electric railways and water companies were represented. Among the representatives who argued for the electric railway interests were H. B. Gill, Philadelphia, who appeared for the American Railways Company; William H. Bedford, for unidentified corporate interests, including the Wilkes-Barre Railway Company, and Charles L. Bailey, for the Central Pennsylvania Traction Company. Attorney-General Bell argued for the bill. Mr. Gill declared that the bill was unfair because it would regulate all companies and not protect them adequately. Regulation and protection should go hand in hand, he said. The bill imposed obligations on holding companies that were not fair. The instance cited was that the commission could compel a holding company to take funds out of its treasury to equip and maintain a subsidiary company. Mr. Gill contended that the bill enlarged the scope of the law of negligence in that it surrounded the public carrier with innumerable regulations as to safety devices and conveniences, which, if not carried out by the companies, would render the company liable in damages. The bill should be so amended as to prevent increased liability. The clause referring to the right of appeal to the Dauphin County courts was declared unjust by the speaker in that it prevented the defendant companies from producing additional testimony when appearing before that court. The position of the commission in this instance would be one of a jury to review facts and render a verdict, and the appeal would only permit a review of the law. Attorney-General Bell explained that this provision was included in order to expedite business and reduce litigation. The appeal to the courts was purely optional and left to the companies the right to institute equity proceedings in any court and consequently would permit further testimony.

In a letter sent to Jesse K. Johnston at Charleroi, his home town, on April 16, 1911, the Governor expressed the opinion that the bill as presented meets the demands of the people. He said: "There is a pressing necessity for the regulating of public utilities or public service companies and the creation of a commission before which any resident of the State may file complaint against a public service corporation for violation of the law and to compel those companies to give such reasonable and satisfactory service as the public has a right to expect and which it was intended should be given when these companies were given privileges by charter rights."

The introduction of new bills was stopped on April 20, and thus far about 700 bills and resolutions have been reported to House committees, or less than one-half the total number introduced. Among the new bills introduced last week were these: To require street railways to remove tracks to center of highways in villages under penalty of \$25 for each day notice to do so is disregarded; to amend anti-railroad discrimination act so as to permit the granting of free transportation to members of the Legislature or other State employees when traveling on State business; to require railroads to fence in rights-of-way, maintain lights under all bridges and watchmen at all grade crossings; to enforce provisions of Section 5 of Article 17 of the Constitution, prohibiting railroads from engaging in mining or manufacturing. The penalty for violation is \$10,000 fine and imprisonment for not more than two years.

Governor Tener has signed the bill reorganizing the Bureau of Railways in the Internal Affairs Department and establishing the offices of chief and assistant chief of said bureau. Freeman C. Gerberich, of Dauphin, late assistant superintendent of the bureau, is made chief and one of the clerks will be made assistant chief.

Financial and Corporate

New York Stock and Money Markets

April 25, 1911.

Trading in Wall Street has shown activity but prices have declined. In to-day's market the entire list fell off, with United States Steel leading actively. Bond market transactions were in excess of daily totals for several weeks and a gain in prices was registered at the close. Money continues abundant and cheap. Quotations to-day were: Call, 2@2 $\frac{3}{8}$ per cent; ninety days, 2 $\frac{1}{2}$ @2 $\frac{3}{4}$ per cent.

Other Markets

Aside from a slight rally in traction issues during the early part of the week, the Philadelphia Exchange has shown no features of interest since last report. Prices have been irregular and trading dull.

In Chicago a limited amount of trading has been done, with price fluctuations prevalent throughout the week. Trading in tractions has been secondary and barring a fractional advance in South Side Elevated bonds the markets show little of interest.

The Boston Exchange has been fairly active since the middle of the week and to-day's market showed a strong undertone. Trading in tractions has been nominal. Interest has been centered chiefly in coppers.

Norfolk & Portsmouth Traction 5s showed substantial gains in the Baltimore market to-day and general trading has been the most active for some time, with prices firmer than for the earlier part of the week.

Quotations of traction and manufacturing securities as compared with last week follow:

	April 18.	April 25
American Light & Traction Company (common).....	a287	a288
American Light & Traction Company (preferred)....	a106	a106
American Railways Company.....	a44 $\frac{1}{2}$	a44 $\frac{1}{2}$
Aurora, Elgin & Chicago Railroad (common).....	a44	a40
Aurora, Elgin & Chicago Railroad (preferred).....	a88	a86
Boston Elevated Railway.....	a128	127 $\frac{1}{2}$
Boston Suburban Electric Companies (common).....	a16	a15
Boston Suburban Electric Companies (preferred)....	71	72
Boston & Worcester Electric Companies (common)...	9 $\frac{1}{2}$	8
Boston & Worcester Electric Companies (preferred)..	44	a47
Brooklyn Rapid Transit Company.....	76 $\frac{1}{2}$	77 $\frac{1}{2}$
Brooklyn Rapid Transit Company, 1st ref. conv. 4s..	83 $\frac{1}{2}$	84
Capital Traction Company, Washington.....	*126 $\frac{1}{2}$	a126 $\frac{1}{2}$
Chicago City Railway.....	a190	a190
Chicago & Oak Park Elevated Railroad (common)....	3	3
Chicago & Oak Park Elevated Railroad (preferred)..	6	6
Chicago Railways, pteptg., ctf. 1.....	a90	a90
Chicago Railways, pteptg., ctf. 2.....	a23 $\frac{1}{2}$	a22 $\frac{1}{2}$
Chicago Railways, pteptg., ctf. 3.....	a9 $\frac{1}{2}$	a9
Chicago Railways, pteptg., ctf. 4.....	a5 $\frac{1}{2}$	a5 $\frac{1}{2}$
Cincinnati Street Railway.....	*130	a131
Cleveland Railway.....	a95 $\frac{1}{4}$	a97
Columbus Railway (common).....	*96	a96
Columbus Railway (preferred).....	*100	100
Consolidated Traction of New Jersey.....	a76 $\frac{1}{2}$	a76
Consolidated Traction of N. J., 5 per cent bonds....	a105	a105
Dayton Street Railway (common).....	a30	a30
Dayton Street Railway (preferred).....	100	100
Detroit United Railway.....	71 $\frac{1}{2}$	a71
Detroit Electric Company.....	150	151 $\frac{3}{4}$
Georgia Railway & Electric Company (common)....	a133	a132
Georgia Railway & Electric Company (preferred)....	a91	91
Interborough Metropolitan Company (common)....	17 $\frac{1}{2}$	18
Interborough Metropolitan Company (preferred)....	50 $\frac{3}{4}$	49 $\frac{1}{2}$
Interborough Metropolitan Company (4 $\frac{1}{2}$ s).....	78 $\frac{1}{2}$	78 $\frac{1}{2}$
Kansas City Railway & Light Company (common)....	21 $\frac{1}{2}$	a21
Kansas City Railway & Light Company (preferred)....	70	a70
Manhattan Railway.....	137	137
Massachusetts Electric Companies (common).....	a16 $\frac{1}{2}$	16 $\frac{1}{2}$
Massachusetts Electric Companies (preferred).....	a87	a87 $\frac{1}{2}$
Metropolitan West Side, Chicago (common).....	24	a24
Metropolitan West Side, Chicago (preferred).....	67	a68
Metropolitan Street Railway, New York.....	15	*15
Milwaukee Electric Railway & Light (preferred)....	110	110
North American Company.....	70 $\frac{5}{8}$	70 $\frac{1}{2}$
Northern Ohio Light & Traction Company.....	45	a44
Northwestern Elevated Railroad (common).....	a21 $\frac{1}{2}$	a21
Northwestern Elevated Railroad (preferred).....	a104	65
Philadelphia Company, Pittsburgh (common).....	a53	a53 $\frac{1}{4}$
Philadelphia Company, Pittsburgh (preferred).....	a43	a43
Philadelphia Rapid Transit Company.....	a16 $\frac{3}{4}$	a17 $\frac{1}{2}$
Philadelphia Traction Company.....	83 $\frac{3}{4}$	83 $\frac{3}{4}$
Public Service Corporation, 5% col. notes (1913)....	100 $\frac{1}{2}$	100 $\frac{1}{2}$
Public Service Corporation, ctf. s.....	a106	a106
Seattle Electric Company (common).....	a106	a107
Seattle Electric Company (preferred).....	a98	a98
South Side Elevated Railroad (Chicago).....	a71	*a71 $\frac{1}{2}$
Third Avenue Railroad, New York.....	a10	10 $\frac{1}{4}$
Toledo Railways & Light Company.....	a7 $\frac{1}{2}$	a8
Twin City Rapid Transit, Minneapolis (common)....	a108 $\frac{1}{2}$	a108 $\frac{1}{2}$
Union Traction Company, Philadelphia.....	a44 $\frac{3}{4}$	a45 $\frac{1}{2}$
United Rys. & Electric Company, Baltimore.....	18 $\frac{3}{4}$	a18 $\frac{5}{8}$
United Rys. Inv. Co. (common).....	42 $\frac{1}{2}$	a42
United Rys. Inv. Co. (preferred).....	72	a72
Washington Ry. & Electric Company (common).....	37	a35 $\frac{1}{2}$
Washington Ry. & Electric Company (preferred)....	89	a90
West End Street Railway, Boston (common).....	a90	a90
West End Street Railway, Boston (preferred).....	103	a103 $\frac{1}{2}$
Westinghouse Elec. & Mfg. Co.....	a66	a67
Westinghouse Elec. & Mfg. Co. (1st pref.).....	a117	a117 $\frac{1}{2}$

aAsked. *Last sale.

Annual Report of the Twin City Rapid Transit Company

Revenues and expenses of the Twin City Rapid Transit Company for the calendar years 1910 and 1909 compare as follows:

	1910.	1909.
RECEIPTS.		
Revenue from transportation.....	\$7,481,696	\$6,924,656
Revenue from operation other than transportation...	49,952	45,119
Total operating revenue.....	\$7,531,648	\$6,969,775
EXPENSES.		
Maintenance of way and structure.....	\$315,766	\$256,989
Maintenance of equipment.....	373,065	345,753
Traffic expenses.....	49,414	41,834
Conducting transportation.....	2,323,577	2,038,577
General and miscellaneous expense.....	604,880	611,473
Total operating expense.....	\$3,667,702	\$3,294,626
Net revenue.....	\$3,863,946	\$3,675,149
Interest on debts and taxes.....	1,466,394	1,466,527
Surplus available for dividends and depreciation...	\$2,397,552	\$2,208,622
Dividends preferred stock.....	\$210,000	\$210,000
Dividends common stock.....	1,206,000	1,055,250
Total dividends.....	\$1,416,000	\$1,265,250
Surplus from operation.....	\$981,552	\$943,372
Appropriated for renewals.....	736,000	703,000
Income account, surplus.....	\$245,552	\$240,372
Percent total operating (including taxes and renewal appropriations) to total revenue.....	64.77	64.20

C. G. Goodrich, the president, says in part in the report:

"A comparison of the statement with that of the previous year shows an increase in gross earnings of 8.06 per cent, an increase in expense of operation of 11.32 per cent and an increase in net earnings of 5.13 per cent.

"The low stage of water in the Mississippi River during the year caused an abnormal increase in the operating expenses of approximately \$115,000, while an increase in trainmen's wages added \$30,000 more, making a total increase of \$145,000.

"The payments for dividends during the year were \$150,750 more than for 1909.

"The property of the company has been maintained at the usual high state of efficiency as evidenced by the actual charges for maintenance during the year, which have amounted to \$605,684, an increase of \$82,185 over the previous year.

"In addition to the above, there has been expended in renewals during the year and charged against the renewal funds \$483,826.42.

"To the renewal funds a direct appropriation from surplus of \$736,000 has been added, together with the interest on the invested renewal fund bonds amounting to \$58,000. The direct appropriation for the previous year was \$703,000 and the interest \$50,050, so that the total amount carried to the renewal funds for the past year exceeds that of the previous year by \$40,950. The renewal funds now stand at \$1,932,087, of which \$1,173,500 is invested in the 5 per cent consolidated bonds of the company.

"The amounts appropriated for maintenance and renewals for the past five years, with their percentage of gross earnings, are as follows:

Year.	Maintenance and Renewal.	Per Cent of Gross Earnings.
1906	\$917,253.34	16.25
1907	985,456.92	16.27
1908	1,070,475.56	16.73
1909	1,276,548.91	18.31
1910	1,399,684.34	18.58

"The surplus for the year, after providing for the large operating and maintenance charges, depreciation, taxes and increased dividends, amounts to \$245,552, an increase of \$5,179, or 2.16 per cent over last year.

"The insurance fund has been further increased during the year by the addition of \$28,501 and now stands at \$162,968, of which \$107,000 is invested in the 5 per cent consolidated bonds of the company and the balance is in cash.

"The expenditures during the year for new construction amounted to \$1,072,976.

"As shown above, the expenditures for new construction during the year amounted to \$1,072,976 and for renewals \$483,826, a total of \$1,556,802. This has been done without the sale of additional stock or bonds."

The number of revenue passengers carried in 1910 was 146,980,553 and the number of transfers redeemed was 48,813,577. The corresponding figures for 1909 were 135,729,811 and 44,124,296.

Richmond, Portsmouth and Norfolk Properties to Be Merged

The following official announcement has been made in regard to a plan to merge the Virginia Railway & Power Company, Richmond, Va., and the Norfolk & Portsmouth Traction Company, Norfolk, Va.:

"Announcement is made that an agreement has been reached between the interests controlling the Virginia Railway & Power Company and the Norfolk & Portsmouth Traction Company for the merger and consolidation of the Norfolk & Portsmouth Traction Company with the Virginia Railway & Power Company.

"The Virginia Railway & Power Company has outstanding \$4,500,000 par value of 5 per cent preferred stock, \$7,450,000 par value of common. The company has paid a dividend of 1½ per cent on preferred stock for the fiscal year ended June 30, 1910, and since has been paying 5 per cent on preferred stock, payable semi-annually.

"The Norfolk & Portsmouth Traction Company has outstanding \$3,000,000 of 5 per cent preferred and \$3,000,000 common. The company has been paying dividends on the preferred stock at the rate of 5 per cent per annum, payable quarterly since its issue in the early part of the year 1910.

"The combined properties are earning at the rate of approximately \$4,500,000 per annum gross and it is believed that by the consolidation of the properties considerable economy can be effected in the operation of the same, with increased efficiency of the same in the service rendered, and the result of the operation of all the properties under one management and control will be to the benefit of the holders of the securities of both companies and give a broader market for the securities of the consolidated companies.

"The stocks of the Virginia Railway & Power Company are now listed on the exchanges of New York, Philadelphia and Baltimore, and the stocks of the Norfolk & Portsmouth Traction Company are listed on the exchanges of Philadelphia and Baltimore.

"Details of the proposed consolidation, including basis of exchange of stocks, are being worked out and it is anticipated that the completed plan will be submitted to the board of directors and stockholders of the prospective companies for their action thereon in the near future.

"The present plan is to have the merger become effective July 1, 1911, since the fiscal years of both companies close on June 30."

Annual Report of the General Electric Company

Profits of the General Electric Company for the year ended Dec. 31, 1910, including \$78,651 from securities sold and \$2,198,099 from royalties, income from securities owned, etc., after deduction of all patent and general expenses, fixed charges and allowances for depreciation and losses, and writing off \$4,661,175 from factory plants were \$10,855,692. Dividends, including the payment of Jan. 14, 1911, were \$5,214,368, leaving a surplus of \$5,641,324. The surplus at the end of the previous fiscal year was \$17,381,382, making a total surplus on Dec. 31, 1910, of \$23,022,706.

C. A. Coffin, the president, states in his report to shareholders:

"The valuation at which the stocks and bonds owned by the company a year ago were then carried on its books has not been changed. While there has been an appreciation in value of some items therein, such increase is held in reserve to offset possible shrinkage in others.

"As was the case last year, liberal depreciations have been written off factory plants, a considerable part of the expenditures thereon having been for purposes other than those of actual production. In some of your company's shops there is still a considerable amount of idle facilities due to a lessened demand for certain articles of manufacture, while large expenditures have been necessary to provide for the production of other articles for which there has been an increased demand."

Total orders received for the year were \$71,182,391, as compared with \$54,360,562 in the preceding year, and were the largest for any year since the organization of the company.

J. R. Lovejoy, vice-president, says in part, in his report upon sales:

"The increased business this year came largely from our

many thousand established customers in small contracts and current orders, rather than from new enterprises requiring large amounts of electrical apparatus.

"Our high-voltage direct-current railway system has most satisfactorily fulfilled the requirements of interurban electric railways and steam railroad companies. The reliability of this system has been fully demonstrated by its continued successful operation on many electric and steam railways. A number of these railways have during the past year placed orders with us for additional equipments. Over 85,000 hp of our 1200-volt d.c. motor equipments are in service and on order.

"Our facilities for the manufacture of Curtis steam turbines have been taxed to the maximum during the past year. Increased facilities are being provided to meet the demand. Curtis steam turbines of our manufacture in excess of 2,600,000 hp are now installed and on order in the United States and abroad. Several turbine generators of a capacity of 27,000 hp each are now in process of manufacture for the Commonwealth Edison Company of Chicago and the New York Edison Company. The Curtis steam turbine, because of its high economy and low cost of maintenance, is replacing steam engines, thus effecting great savings in fuel and cost of operation. We have standardized a complete line of vertical and horizontal shaft Curtis turbines for operation with high, mixed and low-pressure steam for driving electric generators and for many other purposes.

"The outlook for the future is promising. The business of lighting and power companies is growing rapidly; electric railway companies are improving their service and extending their lines in keeping with the increased population. Steam railway companies are electrifying their shops, terminals and branch lines. The use of motors and other electrical appliances for industrial purposes is extending as their utility and value are more thoroughly understood and demonstrated."

Chicago (Ill.) Consolidated Traction Company.—Judge Grosscup in the United States Circuit Court at Chicago, Ill., has entered an order discharging John M. Roach, David R. Forgan and A. L. Drum as receivers of the Chicago Consolidated Traction Company and its subsidiary companies.

Columbia Electric Street Railway, Light & Power Company, Columbia, S. C.—Stockholders of the Columbia Electric Street Railway, Light & Power Company will vote on May 15, 1911, to increase the authorized stock of the company from \$1,600,000, consisting of \$1,000,000 of common stock and \$600,000 of 6 per cent cumulative preferred stock, to \$3,000,000, to be composed of \$2,000,000 of common stock and \$1,000,000 of preferred stock. At the same time the stockholders will vote to change the name of the company to the Columbia Railway, Gas & Electric Company.

Dry Dock, East Broadway & Battery Railroad, New York, N. Y.—Judge Lacombe has authorized F. W. Whitridge, as receiver for the Dry Dock, East Broadway & Battery Railroad, to issue \$350,000 of 6 per cent gold certificates, the proceeds of which will be used to substitute electric battery cars for the present horse cars on the line.

Greenville, Spartanburg & Anderson Railway, Anderson, S. C.—The Greenville, Spartanburg & Anderson Railway has been granted permission by the State of South Carolina to increase its capital stock from \$300,000 to \$4,000,000.

Metropolitan Street Railway, New York, N. Y.—The sale of the property of the Metropolitan Street Railway under foreclosure has been adjourned again, this time from April 20, 1911, to June 22, 1911, on account of the proceedings which are pending before the Public Service Commission of the First District of New York.

Second Avenue Railroad, New York, N. Y.—George W. Linch, receiver for the Second Avenue Railroad, has applied to the Supreme Court for permission to spend \$27,306 in making connections in Fifty-ninth Street so as to permit the running of cars through Fifty-ninth Street and up First Avenue to 125th Street.

Southwestern Street Railway, Philadelphia, Pa.—At the sale of the property of the Southwestern Street Railway under foreclosure on April 21, 1911, the road was purchased by David Wallerstein for \$177,000 in the interest of the bondholders.

United Railways & Electric Company, Baltimore, Md.—Gross earnings of all lines of the United Railways & Electric Company for the year ended Dec. 31, 1910, were \$7,687,895, an increase of \$477,911, or 6.63 per cent over the preceding year. Operating expenses were \$3,601,896, an increase of \$240,024, or 7.14 per cent. Net earnings from operation were \$4,085,999 and other income was \$2,490, making total income of \$4,088,489. Fixed charges, taxes and sinking fund requirements amounted to \$2,861,635, leaving a balance of \$1,226,853, of which \$864,049 was credited to extraordinary expenditures. The final balance of \$362,804 was carried to the credit of profit and loss. President William A. House refers in his annual report to the substantial consummation of the plans for the rehabilitation of the property.

Dividends Declared

Cape Breton (N. S.) Electric Company, \$3, preferred; \$2, common.
 Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred.
 Connecticut Railway & Lighting Company, Bridgeport, Conn., quarterly, 1 per cent, preferred; quarterly, 1 per cent, common.
 Georgia Railway & Electric Company, Atlanta, Ga., quarterly, 1¼ per cent, preferred.
 Hartford & Springfield Street Railway, Warehouse Point, Conn., 3 per cent, preferred.
 Lewiston, Augusta & Waterville Street Railway, Lewiston, Maine, quarterly, 1½ per cent, preferred.
 Lincoln (Neb.) Traction Company, quarterly, 1½ per cent, preferred.
 Mexico (Mex.) Tramways, quarterly, 1¾ per cent.
 Ohio Traction Company, Cincinnati, Ohio, quarterly, 1¼ per cent, preferred.
 Toledo, Bowling Green & Southern Traction Company, Bowling Green, Ohio, quarterly, 1¼ per cent, preferred.
 Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.
 West Penn Railways, Pittsburgh, Pa., quarterly, 1¼ per cent, preferred.

MONTHLY ELECTRIC RAILWAY EARNINGS

CAPE BRETON ELECTRIC COMPANY, LIMITED.

Period.	Gross Revenue.	Operating Expenses.	Net Revenue.	Fixed Charges.	Net Income.
1m., Jan. '11	\$27,443	\$14,811	\$12,631	\$6,132	\$6,499
1 " " '10	25,335	15,462	9,873	6,174	3,699
12 " " '11	328,118	169,536	158,582	73,793	84,788
12 " " '10	290,158	169,780	120,378	74,030	46,349

CLEVELAND, SOUTHWESTERN & COLUMBUS RAILWAY.

1m., Feb. '11	\$75,263	\$45,727	\$29,536	\$30,174	†\$638
1 " " '10	64,260	45,144	19,116	29,794	†10,678
2 " " '11	156,068	93,995	62,073	59,894	2,179
2 " " '10	135,292	93,277	42,016	59,588	†17,572

EL PASO ELECTRIC COMPANY.

1m., Jan. '11	\$61,769	\$33,962	\$27,807	\$8,247	\$19,560
1 " " '10	57,958	29,489	28,469	8,633	19,836
12 " " '11	644,469	373,530	270,939	98,625	172,315
12 " " '10	607,404	359,310	248,094	98,955	149,139

JACKSONVILLE ELECTRIC COMPANY.

1m., Jan. '11	\$52,765	\$27,607	\$25,158	\$10,254	\$14,904
1 " " '10	46,880	24,976	21,904	9,223	12,681
12 " " '11	581,967	313,869	268,098	114,029	154,069
12 " " '10	495,722	271,950	223,772	112,690	111,082

KANSAS CITY RAILWAY & LIGHT COMPANY.

1m., Mar. '11	\$656,062	\$354,952	\$301,109	\$197,944	\$103,165
1 " " '10	622,555	347,084	275,472	174,893	100,578
10 " " '11	6,426,210	3,733,381	2,692,829	1,899,523	793,306
10 " " '10	5,961,714	3,354,467	2,607,247	1,718,458	888,789

NORTHERN OHIO TRACTION & LIGHT COMPANY.

1m., Feb. '11	\$172,413	\$104,868	\$67,545	\$44,357	\$23,188
1 " " '10	146,207	92,513	53,693	43,292	10,402
2 " " '11	358,684	211,772	146,912	88,786	58,126
2 " " '10	311,151	187,014	124,137	86,583	37,554

NORTHERN TEXAS ELECTRIC COMPANY.

1m., Jan. '11	\$124,009	\$69,132	\$54,877	\$24,484	\$30,394
1 " " '10	105,849	61,134	44,715	18,190	26,526
12 " " '11	1,460,967	774,218	686,749	241,911	444,838
12 " " '10	1,276,463	699,326	577,137	205,145	371,991

PUGET SOUND ELECTRIC RAILWAY.

1m., Jan. '11	\$142,251	\$118,959	\$23,293	\$48,314	†\$25,022
1 " " '10	144,369	105,824	38,545	50,236	†11,691
12 " " '11	1,913,172	1,265,545	647,627	606,157	41,470
12 " " '10	1,890,607	1,257,971	632,636	576,230	56,406

TAMPA ELECTRIC COMPANY.

1m., Jan. '11	\$53,224	\$28,676	\$24,548	\$6,082	\$18,466
1 " " '10	53,361	30,309	23,051	4,566	18,485
12 " " '11	592,827	326,330	266,497	66,153	200,344
12 " " '10	598,685	346,449	252,237	56,025	196,212

Traffic and Transportation

Transfer Talks in Kansas City

The Metropolitan Street Railway, Kansas City, Mo., is using the backs of its transfers in a campaign of "messages" to its patrons. Perhaps the most important statement which the company has made in this way relates to the disposition which is made of each nickel in fare which the company receives. This statement follows:

"Adhering to the principle that it is far 'more blessed to give than to receive,' the Metropolitan's officials claim the company should be placed on a very high pinnacle. The following will show to every party who paid a nickel for transportation during the year ended Dec. 31, 1910, how that nickel was disbursed by the Metropolitan Street Railway.

"You pay 5 cents. It was paid out as follows:

Maintenance track, roadway and structures.....	.5860 ct.
Maintenance rolling stock and equipments.....	.4146 ct.
Car service (wages trainmen, etc.).....	1.2002 cts.
Motive power.....	.4123 ct.
Injuries and damages.....	.3412 ct.
Administration, insurance, etc.....	.1503 ct.
Taxes.....	.4119 ct.
Fixed charges.....	1.4270 cts.
Construction and equipment expenditures.....	.7898 ct.

Total expended..... 5.7333 cts.

"Above statement indicates that the company has expended 5.7333 cents for every 5 cents received from passengers."

Other recent paragraphs on transfers follow:

"Good nature divides our burdens and carries three-fourths of them. If the car is a bit crowded when everybody wants to go downtown or home at once, try to keep sweet. It always helps."

"Conductors and motormen have their troubles. They are instructed to treat you politely, and naturally prefer to do so. Be fair with them."

"Why not occupy the vacant space in the front part of the car, thus avoiding the crowd and the pushing when you want to get off?"

"There are natural discomforts when everybody wants to go home or downtown at once. All cities have them. To be grouchy about it only aggravates the trouble."

Albany-Rensselaer Fare Case Argued Before Court

The appeal of the Cohoes (N. Y.) Railway from the order of the Appellate Division affirming the determination of the Public Service Commission reducing the fare between Albany and Rensselaer on the company's cars from 6 cents to 5 cents was argued at Albany on April 24, 1911. The action was first brought before the Public Service Commission on a complaint against the railway made by Francis P. Lithgow, of Rensselaer, and a stay of execution of the lower court's order was granted pending the decision of the Court of Appeals.

Lewis E. Carr, for the company, argued that on April 29, 1895, the Albany Railway made a contract with the Albany & Greenbush Bridge Company to build a double railway track on the bridge, the railway company in return agreeing to keep and render each month an account of the number of passengers carried in its cars over the bridge, and during the continuance of the contract to pay 1 cent for each and every passenger so carried. The contract also provided that the railway should not charge more than 6 cents fare. On April 27, 1897, the city of Rensselaer granted the Albany Railway a franchise authorizing it to construct certain lines of street railway, with a 5-cent fare in Rensselaer and not to exceed 6 cents to the corner of Broadway and State Street, Albany. On March 22, 1905, the Cohoes Railway leased the street railroad in Rensselaer from the United Traction Company, which had succeeded to the properties and franchises of the Albany Railway on Dec. 30, 1899.

Mr. Carr contended that the relator in collecting 6 cents from each passenger in its cars crossing the bridge collected 5 cents for itself and 1 cent for the bridge company, acting as its agent for that purpose, and did not therefore violate the Barnes act of 1905, providing for a 5-cent fare, as is contended. The right of the Greenbush Bridge Company to charge tolls was not affected by the Barnes act, which was Chapter 358 of the Laws of 1905, and the act

did not confer a right on the passenger to cross the bridge without payment of toll. The fact that the Albany Southern Railway does not collect the extra cent from its passengers for the bridge toll did not in any way affect the right of the Cohoes Railway. Chapter 358, as construed by the Public Service Commission, Mr. Carr declared, was unconstitutional because it impaired the obligation of contracts and denied to the railroad company the equal protection of the laws. The law attempted to create a distinction between the United Traction Company in Rensselaer and Albany and street railways in the other cities of the State. It denies this railroad a right which every other one engaged in similar service is permitted to enjoy.

Ledyard P. Hale, counsel for the Public Service Commission, held that the people of the State had not delegated to any municipal corporation the right to exempt common carriers from regulation by law, nor the power to enter into contracts with them which so operate, and that the collection of 6 cents instead of 5 cents could not be justified as being the collection of 5 cents for "fare" and 1 cent for "toll." Mr. Hale contended that Chapter 358 was within the power of the Legislature. Under a familiar rule the construction of ordinances would not be considered as contracts forever binding upon the inhabitants of Rensselaer and the people of the State unless they must be; and if they must be so construed they were voidable at the volition of the Legislature. It seemed clear that the Legislature intended, as between the company and the public, to effect a reduction to 5 cents in the fare in question, to which no toll should be added.

The decision of the commission in regard to the fare between Albany and Rensselaer was referred to in the *ELECTRIC RAILWAY JOURNAL* of Dec. 3, 1910, page 1127, and a summary was published of the ruling of Commissioner Decker in the case.

Fare Complaint Against Schenectady Railway Dismissed

The Public Service Commission of the Second District of New York has dismissed the complaint of the Mayor of Schenectady against the Schenectady (N. Y.) Railway asking the commission to direct the company to sell six tickets for 25 cents as was the practice prior to March, 1909. The commission holds that it has no power to order the relief asked for by the complainant. In an opinion written by Chairman Stevens the commission states that the precise relief asked by the Mayor in his complaint is not that the maximum rate charged by the company shall be less than 5 cents, but that if a person shall buy six tickets at one time he shall get them at a less rate than the maximum for one trip. The power to fix a maximum rate does not include the power to fix a rate for which a number of tickets shall be sold in a block. The regular cash fare for one ride in Schenectady is 5 cents, and in the complaint before the commission it was not alleged that this rate is unreasonable. The powers of the commission in relation to the matter provide that it may determine reasonable rates, fares and charges to be observed and put in force as the maximum to be charged for the service to be performed. The company may upon its own motion establish a fare for a service less than the maximum directed by the commission provided that such action upon its part is not open to the charge of being discriminatory and the commission itself can determine nothing but the maximum charge for the service under consideration.

The complaint was dismissed without prejudice, however, to the filing of any other complaint by either the Mayor of the city or any resident of Schenectady as to the reasonableness of the 5-cent fare.

Subsequently a complaint was received from Charles C. Duryee, Mayor of Schenectady, directed against the rate of fare charged by the Schenectady Railway in that city. He alleges that the rate of 5 cents is excessive and unreasonable and that a maximum rate of 4 cents would return to the company ample revenues for the operation, maintenance and improvement of its property and service and render a reasonable profit upon the investment. The petition alleges that prior to March, 1909, the company was transporting many of its passengers for 4 1/6 cents per passenger, which rate yielded ample revenue, and that at this time it obtained many franchises from Schenectady upon the agreement, express or implied, that such rate

would be maintained, but that since March, 1909, the company has charged 5 cents for the transportation of passengers except for school children at certain hours of the day.

"Strap-Hanger" Ordinance Defined in Minneapolis

On April 21 Judge Willard, of the Federal District Court in Minneapolis, rendered a decision defining the "strap-hanger" ordinance recently passed by the Minneapolis City Council. This ordinance limits the number of passengers upon any car of the Twin City Rapid Transit Company to seventy-five and imposes a fine of not more than \$100 in each case where this limit is exceeded. It also provides that if a person should wish to board a car already containing seventy-five passengers he must be permitted to do so provided there is no other car within 300 ft.

Judge Willard held this ordinance valid, except that inter-urban cars crossing the city limits with more than seventy-five passengers would not be obliged to discharge the excess over the limiting number. He said, however, that the law plainly relieved the company from stopping cars at street corners when such cars had the legal number of passengers. The provision quoted above also relieved the company from penalties for a crowded car when there was no other car with less than the legal number of passengers within 300 ft. In extraordinary occasions where passengers overpowered the conductors and boarded cars the company also could not be held responsible. Briefly, then, an interpretation of the decision would seem to indicate that the legal limit need not be respected except when cars are closer together than 300 ft. Under such circumstances the conductor of every car having seventy-five passengers must be careful not to allow any more passengers to board his car unless the car immediately ahead and the car immediately behind him also have the legal number of passengers each.

On the same day Judge Willard also rendered a decision on the "extension" ordinance in Minneapolis in which the Council demanded that the company build 9 1/2 miles of new track. He held that the company was within its rights in asking for these extensions, but that no penalty attached to the refusal of the company to build them.

Through Service Between Worcester and Providence.—The New England Investment & Security Company, Springfield, Mass., has decided to establish through service between Worcester and Providence, but the schedule has not yet been fully determined. The company now operates through cars between Springfield and Worcester, 59 miles, on hourly schedule, connecting at Worcester with through cars for Boston. With through service between Worcester and Providence there will be only one change in the 100-mile run between Boston and Springfield or Boston and Providence.

"Transit."—The Brooklyn (N. Y.) Rapid Transit Company has begun the publication of *Transit*, an eight-page monthly paper to be devoted to its interests. The first issue of the publication is dated April and is devoted exclusively to the company's plans for development. Like every other large city, Brooklyn is divided into sections the inhabitants of which may be likened to clans, each obsessed with the idea of its own importance. To carry home the idea of what is likely to happen unless all Brooklyn co-operates with the company it shows a map of Brooklyn being torn to pieces on account of the sectional selfishness which dominates the transit question. It asks if this is the way to boost Brooklyn. There is also a map which shows the rapid transit routes of the Brooklyn Rapid Transit system with proposed extensions in Brooklyn, Queens, Manhattan and Richmond, and a summary of what the company's offer means to residents of Brooklyn in the way of saving of time. The company says that the offer means an average saving to Brooklynites who are engaged in business in Manhattan of fifteen minutes a day in each direction. This indicates three hours saved in a week and 150 hours in a year. A detailed schedule is also published which gives the running time from Brooklyn points to Manhattan without change of cars. There is also a summary of opinions from prominent men of Brooklyn who indorse the plans of the company.

Personal Mention

Mr. H. C. Guiteau has resigned as general freight and passenger agent of the San Francisco, Vallejo & Napa Valley Railroad, Napa, Cal.

Mr. L. Paxson, who has been electrical engineer of the Evansville & Southern Indiana Traction Company, Evansville, Ind., for the last six years, has resigned.

Mr. L. Butler has been appointed electrical engineer of the Evansville & Southern Indiana Traction Company, Evansville, Ind., to succeed Mr. L. Paxson, resigned.

Mr. J. C. Woodsome, who has been connected with the Stone & Webster properties in Dallas, Tex., has been appointed general manager of the Tampa (Fla.) Electric Company to succeed Mr. J. A. Trawick, resigned.

Prof. Winthrop Moore Daniels, who is connected with Princeton University, has been appointed a member of the Board of Public Utility Commissioners of New Jersey to succeed Mr. Frank H. Sommer, whose term of office has expired.

Mr. G. H. Dodge has become connected with the Northern Illinois Electric Railway, Amboy, Ill., in charge of construction and operation. Mr. Dodge was formerly acting superintendent of the Syracuse & South Bay Electric Railroad, Syracuse, N. Y.

Mr. Charles J. Munton, who has been connected with the Milwaukee Electric Railway & Light Company for twelve years, has been appointed general manager of the Toledo & Chicago Interurban Railway, Kendallville, Ind., to succeed J. McM. Smith, deceased.

Mr. W. T. Maddox, formerly superintendent of the Los Angeles & Redondo Railway, Redondo Beach, Cal., has been appointed superintendent of the south division of the Pacific Electric Railway, Los Angeles, Cal., and affiliated lines in Los Angeles, to succeed Mr. Thomas McCaffery, resigned.

Mr. Herbert B. Flowers has been appointed assistant superintendent of the Pontiac division of the Detroit (Mich.) United Railway. Mr. John C. Clark has been appointed assistant superintendent of the Orchard Lake division of the company. Mr. Flowers was formerly assistant superintendent of the Orchard Lake division, in which capacity Mr. Clark succeeds him.

Mr. J. C. McPherson, formerly superintendent of the Los Angeles city lines of the Pacific Electric Railway and later assistant superintendent of the north division of the company, has been appointed superintendent of the north division to succeed Mr. J. B. Rowray, resigned. Mr. McPherson has been connected with the Huntington interests for the last thirteen years. Before going to California he was connected with the Santa Fé Company with headquarters at Albuquerque and Las Vegas, N. M.

Mr. J. B. Rowray has resigned as superintendent of the north division of the Pacific Electric Railway, Los Angeles, Cal., and affiliated lines to become superintendent of the Northern Electric Railway, Chico, Cal., which operates 130 miles of road. Mr. Rowray recently had his jurisdiction with the consolidated electric railways at Los Angeles extended by the addition of the Glendale line and the Pasadena city line. Besides these lines Mr. Rowray had charge of the Mountain division, Glendora, Covina, Sierra Madre, El Molino, Pasadena Short Line, South Pasadena, Annandale, Oak Knoll and San Gabriel lines.

Mr. Thomas McCaffery has resigned as superintendent of the south division of the Pacific Electric Railway, Los Angeles, Cal., and affiliated lines in Los Angeles to become manager of the Automatic Distributing Company, Los Angeles, Cal. Mr. McCaffery was appointed master of transportation of the Los Angeles division of the Pacific Electric Railway in 1907. Later he was made superintendent of transportation of the company and subsequently was made general superintendent of the Pacific Electric Railway and the Los Angeles Interurban Railway. Before becoming connected with the Pacific Electric Railway Mr. McCaffery was in the employ of the Southern Pacific Company for thirty years.

Mr. J. A. Trawick has resigned as general manager of the Tampa (Fla.) Electric Company, a Stone & Webster prop-

erty, to become connected with the Keokuk & Hamilton Water Power Company, which is building a dam across the Mississippi River between Keokuk, Ia., and Hamilton, Ill. The Keokuk & Hamilton Water Power Company is being financed by Stone & Webster and Mr. Trawick will be associated in his work with the company with Mr. Hugh L. Cooper, New York, N. Y., who is well known for his work in connection with the developments of the Electrical Development Company at Niagara, the McCall's Ferry Power Company, on the Susquehanna River, and the Great Western Power Company in California.

Mr. James Campbell, president of the North American Company, New York, N. Y., has been elected president of the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company, Milwaukee, Wis., to succeed Mr. John I. Beggs, resigned, who, as previously announced in the *ELECTRIC RAILWAY JOURNAL*, has been elected president of the St. Louis Car Company. Mr. Campbell is a resident of St. Louis, where he has been very prominent in banking and financial circles for many years. He began his career as a civil engineer. He has a large financial interest in the St. Louis & San Francisco Railroad and is first vice-president of the Union Electric Light & Power Company, St. Louis, Mo., and a director of the Laclede Gas Company, St. Louis, and the United Railways of St. Louis.

Col. E. C. Spring, who since October, 1910, has been assistant to the president of the Lehigh Valley Transit Company, Allentown, Pa., in charge of traffic, has been appointed assistant to the president of the Philadelphia & Western Railway, Upper Darby, Pa. The Philadelphia & Western Railway is building a high-speed double-track extension from Strafford to Norristown and North Wales to connect with the Lehigh Valley Transit Company's line at the latter point and enable that company to run through cars from Allentown to the Sixty-ninth Street terminus of the elevated lines of the Philadelphia Rapid Transit Company. In his position as assistant to the president, Mr. Spring will have charge of the operation of the road and the construction of the extension. Mr. Spring will probably make his headquarters at Bryn Mawr or Villa Nova.

Mr. Edward M. Raver, for several years connected with the Ft. Wayne & Northern Indiana Traction Company as city superintendent in Ft. Wayne, Ind., has recently become connected with the Michigan United Railways as city superintendent at Jackson, Mich. Mr. Raver began his street railway career in 1892 as a motorman with the Ft. Wayne & Northern Indiana Traction Company in Logansport, Ind. He was made road officer of the company in 1902 and a short time later his jurisdiction was extended over the interurban division from Logansport to Wabash, Ind. In October, 1904, Mr. Raver was appointed division superintendent of the Ft. Wayne & Wabash Valley Traction Company's lines between Logansport, Peru and Wabash, and in May, 1907, he was transferred to the Ft. Wayne city division as superintendent, in which capacity he remained until April 10, 1911, when he resigned to accept the position of city superintendent at Jackson, Mich., with the Michigan United Railways.

Mr. William McClellan, vice-president of the Campion McClellan Company, New York, N. Y., has been appointed electrical engineer to the Public Service Commission of the Second District of the State of New York. Mr. McClellan is a graduate of the University of Pennsylvania and for a time was engineer in charge of construction with the Philadelphia Rapid Transit Company. In 1905 he came to New York City to become associated with Westinghouse, Church, Kerr & Company, and took an active part in the installation by that firm of the single-phase equipment on the Erie Railroad. He has always maintained an especial interest in electric railway work and has served as chairman of the railway committee of the American Institute of Electrical Engineers and is a member of the committee on the electrification of steam railroads of the New York Railroad Club. Mr. McClellan is also a director in the Automatic Train Stop Company and president of the McClellan-Lines Company, manufacturers.

Mr. James D. Mortimer, who was elected vice-president and secretary of the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Com-

pany, Milwaukee, Wis., in February, 1910, and who has been acting as general manager of the company, has been elected to the position of general manager and will hereafter have the titles of vice-president, secretary and general manager. Mr. Mortimer was born in Elmhurst, Ill., and was educated at the Throop Polytechnic Institute, Pasadena, Cal., and at the University of California, from which he was graduated in 1900. After completing his college course Mr. Mortimer taught for more than a year and then entered the service of the Tacoma Railway & Power Company, Tacoma, Wash. When Stone & Webster, Boston, Mass., took over the Tacoma Railway & Power Company and the Puget Sound Electric Railway in 1903 Mr. Mortimer was retained as engineer. Mr. Mortimer became identified with the development of the property of the Telluride Power Company while Mr. James Campbell, president of the North American Company, was president of that company, and later he was elected first vice-president of the North American Company, which controls the railway and light properties in Milwaukee. Mr. Mortimer is also receiver of the Toledo & Chicago Interurban Railway, Kendallville, Ind.

Mr. John I. Beggs, retiring president and general manager of the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., was tendered a farewell banquet at the Hotel Pfister, Milwaukee, Wis., on the evening of April 13, 1911, by the heads of the departments of the company. Mr. C. N. Rosencrantz on behalf of Mr. Beggs' associates in the company presented him with a bronze tablet "as a permanent testimonial of their appreciation and regard for him as a man, and as the chief executive of a great property, to the successful administration and upbuilding of which he has given the best years and work of his life." In response Mr. Beggs said that he would not take the tablet with him to St. Louis, but that he would install it at his country home near Oconomowoc, Wis., where his associates in Milwaukee who visited him there could see it. Among those present at the banquet were: Mr. F. V. Benz, chief clerk and purchasing agent; Mr. F. J. Boehn, assistant treasurer; Mr. C. J. Davidson, chief engineer; Mr. C. N. Duffy, comptroller; Mr. G. W. Kalweit, auditor; Mr. George Kummerlein, Jr., superintendent of transportation; Mr. H. A. Mullett, assistant superintendent of rolling stock; Mr. R. H. Pinkley, chief draftsman; Mr. O. M. Rau, chief electrician; Mr. M. S. Rausch, claim agent; Mr. H. A. Rogers, superintendent of the print shop; Mr. C. N. Rosecrantz, attorney, and Mr. F. G. Simmons, superintendent of way.

OBITUARY

Edward H. Wardwell, secretary of the Barrett Manufacturing Company, New York, N. Y., and the United States Gypsum Company and a director of the American Coal Products Company, died at his home in New York on April 22, 1911.

Henry M. Watson, a director of the International Railway, Buffalo, N. Y., and president of the Buffalo Street Railroad and the Buffalo East Side Street Railway before the organization of the International Railway, is dead. Mr. Watson was born in Unadilla, N. Y., on May 18, 1835. His first business connection was with the Albany & Susquehanna Railroad at Albany, N. Y. In 1868 he went to Buffalo and soon thereafter identified himself with the Buffalo Street Railway. Upon the death of S. V. R. Watson, who was president of that company, Mr. Watson succeeded him and held the position until 1899. In 1879 Mr. Watson organized the Bell Telephone Company, Buffalo, N. Y., and was made president of the company. He retained this position until the Bell Telephone Company of Buffalo was amalgamated with the New York Telephone Company about a year and a half ago. Mr. Watson was then made a director in the New York Telephone Company. While he was an officer of the street railways in Buffalo Mr. Watson took an active interest in the affairs of the American Street Railway Association and was president of the association in 1890-91, and a member of the executive committee in 1891-92.

Jacob Wendell, Jr., president of the Wendell & MacDuffie Company, New York, N. Y., died on April 22, 1911, of pneumonia. Mr. Wendell was graduated from Harvard University in 1891 and after leaving college entered the passenger department of the New York Central & Hudson

River Railroad. In 1896 he organized with Mr. R. L. MacDuffie, a Harvard graduate of 1890, the firm of Wendell & MacDuffie, dealers in electric railway supplies, and the firm was appointed the agent in New York of a number of well-known manufacturers. Although Mr. Wendell gave a great deal of attention to the affairs of this firm and made several trips abroad in its interests and to establish European offices, he found time to take an active part in amateur theatricals and was a member of the Comedy Club, the leading amateur dramatic club in New York. Through his courtesy performances by members of this club were given at several conventions of the American Electric Railway Association. Two years ago Mr. Wendell decided to become a professional actor and the firm of Wendell & MacDuffie was incorporated, Mr. Wendell becoming president of the company. He was invited to join the staff of the New Theater Stock Company, with which his rôles, particularly that of the dog in "The Blue Bird," met with great success. He was to have taken the leading part in a new play entitled "What the Doctor Ordered" at the Astor Theater April 21, but the production of the play has been postponed indefinitely on account of his untimely death. He was forty-two years of age, married and had four children.

John D. Keiley, electrical engineer of the New York Central & Hudson River Railroad, died of pneumonia at his residence in Yonkers, N. Y., on April 21. Mr. Keiley was the son of Major J. D. Keiley, member of the Board of Education of Brooklyn, and a director of the Brooklyn Rapid Transit Company. He was born Feb. 6, 1871. After graduation from St. Francis Xavier College of New York City he took a four years' scientific course at Johns Hopkins University, where he specialized in electrical engineering. Upon finishing this course in 1893 he engaged in civil engineering in South Carolina. In 1897 he entered the employ of the Brooklyn Rapid Transit Company and after a few months he was made assistant engineer. Subsequently he was transferred to the electrical engineering department and when train movement tests were inaugurated by the Brooklyn Heights Railroad he invented an instrument to record automatically the movement of the trains and simultaneously the readings of electrical instruments. This device was called by his associates the "Keileyograph," a name which it still bears. Later he was appointed assistant master mechanic of the company. When the electric traction commission of the New York Central Railroad was organized he became its assistant electrical engineer. His familiarity with civil, mechanical and electrical engineering and his high mathematical talents were of the greatest assistance to the commission, and in recognition of his services he was appointed electrical engineer in 1906. He developed many of the practical details of the New York Central type of under-contact third-rail, but his most valuable contribution to the art of electric railroading was probably the circuit-breaker house system of third-rail connection, which has been the means of reducing the investment in copper cables and of increasing the safety of electrically operated railways. In 1907 Mr. Keiley, collaborating with Prof. S. W. Ashe, brought out a book entitled "Electric Railways," which is largely used in technical colleges throughout the country. Mr. Keiley belonged to the Engineers', the Transportation and the New York Railroad clubs.

The Board of Utility Commissioners of New Jersey has been advised by the Attorney-General that it has power to require a street railway to provide and maintain a waiting room or shelter to be used by passengers at transfer junctions or connecting points. The Attorney-General, in his opinion, directs attention to the fact that the act defining the jurisdiction of the board declares that it shall have power, among other things, to require a public utility, as defined by the act, to furnish safe and adequate service. The Attorney-General comments on this as follows: "I think it may be fairly contended that a waiting room or shelter shed, under conditions suggested by the inquiry, is a part of the adequate and perhaps safe service which may be enforced by your board. The word 'adequate' in its common acceptance means equal or proportionate to requirements presented. What would be a reasonable exaction in any given case must depend upon the particular circumstances which are presented for your consideration."

Construction News

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

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

RECENT INCORPORATIONS

***Vincennes, North & South Traction Company, Vincennes, Ind.**—Incorporated in Indiana to build interurban railways in Indiana. Capital stock, \$100,000. Directors: E. D. Logsdon, B. M. Willoughby and J. M. House.

***Elizabeth, New Brunswick & Trenton Railroad, Newark, N. J.**—Incorporated in New Jersey to build an electric railway between Newark and Trenton. Capital stock, \$500,000. Officers are those of the Public Service Corporation. This railway will eventually be turned over to the Public Service Corporation.

***Pottstown & Phoenixville Railway, Pottstown, Pa.**—Application for a charter has been made in Pennsylvania by this company to build an electric railway from Spring City to Saratoga, via Royersford, thus connecting the Pottstown & Reading Street Railway and the Chester line extending from Spring City to Phoenixville. Incorporators: George N. Malsberger, Harry F. Swinchart, Pottstown, and C. Taylor Leland, Philadelphia.

Nashville-Gallatin Interurban Railway, Gallatin, Tenn.—Application for a charter has been made by this company in Tennessee to build a 30-mile railway between Nashville and Gallatin. Capital stock, \$750,000. Incorporators: H. H. Mayberry, John A. Pitts and R. W. McLemore. [E. R. J., Feb. 25, '11.]

FRANCHISES

Oakland, Cal.—The Oakland & Bay Shore Railway Company, allied with the Oakland & Antioch Railway Company, has asked for a fifty-year franchise to build on Shafter Avenue at Fortieth Street and along Shafter Avenue beyond Kieth Avenue. This line will form the connecting link between these lines. [E. R. J., Jan. 21, '11.]

Connecticut Company, New Haven, Conn.—This company will double-track its Bank Street line in Waterbury for almost its entire length, including a new double-track crossing, with connecting curves in Exchange Place.

Boise, Idaho.—The Boise Valley Railway, Boise, has received a franchise from the City Council to extend its tracks on Bannock Street in Boise.

***Bloomington, Ind.**—A survey is being made and franchises will soon be asked for building an electric railway to connect Bedford, Oolitic, Harrodsburg, Smithville, Sanders, Clear Creek and Bloomington.

Gary, Ind.—The Calumet United Railways, Indianapolis, has asked the Board of Public Works for a franchise to build its tracks in Gary. This is part of a plan to build an electric railway to connect Michigan City, Chesterton, Gary, Aetna, East Chicago and Hammond. James A. Slattery, Philadelphia, is interested. [E. R. J., April 22, '11.]

***Emporia, Kan.**—The City Council of Emporia recently granted a franchise to a company composed of men from Dayton, Ohio, to build an electric railway in Emporia, on condition that Judge Dennis Dwyer, Dayton, build the lines.

Louisville, Ky.—The Louisville Railway has asked the General Council for a twenty-year franchise to build a cross-town line in Louisville to connect the Twenty-eighth Street line at the West End and the Barret Avenue line at the East End.

Baltimore, Md.—The Towson & Cockeysville Electric Railway, Cockeysville, has received a franchise from the Highways Commission in Baltimore to build its railway from Towson to Cockeysville. [E. R. J., March 25, '11.]

Springfield, Mass.—The Springfield Street Railway has received permission from the Railway Commissioners to build an extension across the Ludlow Bridge over the Chicopee River, into Ludlow, and to build an extension in Palmer.

Worcester, Mass.—The Worcester Consolidated Street Railway has asked the City Council for a franchise to

build extensions and double-track three of its lines in Worcester.

Benton Harbor, Mich.—The Benton Harbor-St. Joe Railway & Light Company has received a thirty-year franchise from the City Council to extend its tracks in Benton Harbor and continue them to Dowagiac.

Wayzata, Minn.—The Electric Short Line Railroad, Minneapolis, has received a franchise from the Village Council to build its tracks in Wayzata. This line will connect Minneapolis, Medicine Lake and Wayzata. It has been built to a point midway between Medicine Lake and Parker Lake. Earle D. Luce, president. [E. R. J., Nov. 5, '10.]

Kansas City, Mo.—The Metropolitan Street Railway, Kansas City, has received a franchise from the City Council to extend its tracks over certain streets in Kansas City.

St. Louis, Mo.—The Southern Traction Company of Illinois, East St. Louis, has received a franchise from the City Council to operate its line into St. Louis over the Free Municipal Bridge and over downtown streets in St. Louis.

South Orange, N. J.—The Public Service Railway has received permission from the South Orange Township Committee to build connecting switches and crossovers on certain avenues in South Orange.

New York, N. Y.—The Union Railway, New York, has received a franchise from the Council to build an extension on St. Ann's Avenue, from 161st Street to the Southern Boulevard, in New York.

Westchester Street Railway, Mount Vernon, N. Y.—The Public Service Commission, Second District, has approved of the exercise of a franchise granted to the Westchester Street Railway by the Council of Harrison, Westchester County, for the extension of its lines in Underhill Avenue, in Harrison. This company will also reconstruct its Chester Hill line.

Dayton, Ohio.—The City Railway, Dayton, has again asked the City Council for a franchise to extend its Kammner Avenue line westwardly to Brooklyn Avenue and Hoover Avenue, in Dayton.

Erie, Pa.—The Buffalo & Lake Erie Traction Company has received a franchise from the City Council to build extensions and double-track several of its lines in Erie.

Phoenixville, Pa.—The Phoenixville, Valley Forge & Stafford Street Railway, Phoenixville, has received a franchise from the Council to extend its tracks on Nutts Avenue in Phoenixville.

Pittsburgh, Pa.—The Pittsburgh, Neville Island & Coraopolis Street Railways has asked the County Commissioners for permission to build a line on a portion of Narrow Run Road from Coraopolis to the Sewickley Bridge.

Cleburne, Tex.—Daniel Hewitt, representing the Cleburne Street Railway, has asked the City Council for a franchise to extend its lines in Cleburne.

Bismarck, Wash.—The Tacoma Railway & Light Company, Tacoma, has received a twenty-five-year franchise from the Council to extend its McKinley Avenue line in Bismarck.

Hoquiam, Wash.—The Gray's Harbor Railway & Light Company, Aberdeen, has received a franchise from the Council to build in Hoquiam.

***Wenatchee, Wash.**—Louis W. Pratt and Walter M. Harvey will ask the Municipal Council for a franchise to build an electric railway in Wenatchee. This is part of a plan to build a line through the Wenatchee Valley. Application will also be made to the Chelan County Commissioners to build outside the city in the county.

TRACK AND ROADWAY

Turlock Traction Company, Modesto, Cal.—The directors of this company have authorized the issuance of \$500,000 worth of bonds to be used for the construction of this 4-mile electric railway between Turlock and Denair. S. N. Griffith, Turlock is interested. [E. R. J., Apr. 15, '11.]

Pacific Electric Railway, Los Angeles, Cal.—This company will award contracts at once for building its 4½-mile extension from Fourth Street, Glendale, to Burbank. It has secured all rights-of-way for the line connecting Burbank and Los Angeles.

San Francisco, Vallejo & Napa Valley Railroad, Napa, Cal.—Contracts will be awarded by this company during the next two months for building 10 miles of single track. M. McIntyre, Napa, general superintendent.

Central California Traction Company, San Francisco, Cal.—This company will build an extension from Lodi to Woodbridge, a distance of about 2 miles.

***St. Petersburg, Fla.**—J. J. Farnsworth, Fort Lauderdale, is interested in a plan to build an electric railway from St. Petersburg to John's Pass, 7 miles.

***Twin Falls, Idaho.**—W. L. Cherry and associates are negotiating for the purchase of ties and rails for constructing an interurban railway from Twin Falls to Snake River Canyon. The line will be built this summer.

Chicago (Ill.) Railways.—This company is in the market for 1250 tons of girder rails.

Cincinnati, Madison & Western Traction Company, Indianapolis, Ind.—Bids will be received until May 30 by this company for building its 41-mile electric railway to connect Hanover, Madison, Scottsburg and Lexington. J. E. Greeley, Louisville, president. [E. R. J., April 1, '11.]

Gary & Southern Traction Company, Crown Point, Ind.—Work has been begun by this company on its extension from Gary to Crown Point. The company is building from the present terminal of the Gary & Interurban Railway on the Calumet River and will proceed southward.

Gary, Hobart & Eastern Traction Company, Hobart, Ind.—This company is planning to let contracts about May 20 for the 5-mile line from Hobart to Broadway, Gary, Ind. U. P. Hord, Aurora, president. [E. R. J., April 8, '11.]

South Bend, Richmond & Southeastern Traction Company, Richmond, Ind.—Preliminary surveys have been completed for building this 110-mile electric railway to connect Richmond, Union City, Brownsville, Brookville and Harrison. The line will follow the old Whitewater Canal from Brookville. The promoters state that there will be no difficulty in securing necessary capital. F. C. Charles and Charles W. Jordan are interested. [E. R. J., April 8, '11.]

Albia (Ia.) Interurban Railway.—Plans are being made by this company to extend its tracks to Buxton. Right-of-way have been secured and construction will begin as soon as the weather permits.

Iowa City (Ia.) Electric Railway.—This company will begin work at once building two extensions in Iowa City. One line will be extended to the City Park north of Iowa City, and another line will be built south to the Rock Island Station.

New Orleans Railway & Light Company, New Orleans, La.—This company has ordered 500 tons of rails from the Carnegie Steel Company.

Rockland, South Thomaston & St. George Railway, Rockland, Maine.—This company will place contracts during the next few months for building approximately 3½ miles of new track. Alfred S. Black, president.

Electric Short Line Railroad, Minneapolis, Minn.—Plans are being considered by this company for building a 120-mile extension from Minneapolis to Clara City. Frank E. Reed, Glencoe, secretary. [E. R. J., Nov. 5, '10.]

***Bismarck, Belleview Valley & Western Railway, Bismarck, Mo.**—Plans are being made by this company to build a 20-mile electric railway between Bismarck and Sunlight.

Morris County Traction Company, Morristown, N. J.—This company has begun work on Main Street near the Chatham line in Madison on the extension of its line from Morristown eastwardly through Convent, Madison, Chatham and Summit.

Catskill (N. Y.) Traction Company.—This company will begin at once making surveys and securing rights-of-way for building two extensions of its line. One will be from Catskill to Alsen and Cementon, and another from Leeds to Cairo.

New York & Queens County Railway, Long Island City, N. Y.—The New York & Queens County Railway is in the market for 600 tons of rails.

Interborough Rapid Transit Company, New York, N. Y.—This company has received bids on 80,000 tons of plates and shapes for widening the tracks and extending the lines of the Second, Third, Sixth and Ninth Avenue elevated roads. Deliveries are to start within three months of the contract and are to be completed within two years.

***Denver, N. C.**—Plans are being considered for building a 20-mile electric railway to connect Denver, Triangle, Lowesville and Mount Holly. Dr. H. N. Abernethy, chairman; R. E. Proctor, secretary. Others interested are W. C. Proctor, Denver; R. Nixon, Triangle, and I. C. Lowe, Lowesville.

Cincinnati, Hamilton & Dayton Traction Company, Cincinnati, Ohio.—This company will double-track its line between North Baltimore, Ohio, and Toledo. New bridges will be built and complete rehabilitation of the road bed accomplished.

Western Ohio Railway, Lima, Ohio.—It is said that plans are being made by this company to build an 18-mile extension between Fremont and Port Clinton on the lake.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—A contract will be awarded by this company for building a new culvert at Mosier. The work will cost about \$10,000.

Oklahoma City (Okla.) Railway.—This company has arranged for a \$12,000,000 bond issue and extensions of its lines will be made from Oklahoma City to Guthrie, El Reno and Norman.

Oregon Electric Railway, Portland, Ore.—This company is having surveys made for extensions of its lines north and southwest of Albany.

***Chester, Concordville & West Chester Electric Railroad, Concordville, Pa.**—This company is being organized to build an electric railway to connect Chester, West Chester and Concordville. Joseph Shortlidge, Concordville, is interested.

Ephrata & Lebanon Street Railway, Lebanon, Pa.—This company advises that it will begin construction about May 1 on its proposed 23-mile electric railway to connect Ephrata, Lincoln, Clay, Hopeland, Schaefferstown and Lebanon. Capital stock, authorized, \$450,000. Capital stock, issued, \$250,000. The company's power station and repair shops will be located at Ephrata. Officers: H. H. Singer, Ephrata, president; W. B. Horst, Schaefferstown, vice-president, and M. H. Shirk, Lincoln, secretary and treasurer. [E. R. J., Apr. 8, '11.]

Philadelphia & Western Railway, Philadelphia, Pa.—Stone & Webster, Boston, Mass., have been awarded the contract to complete the extension of this railway from Stafford to Norristown and North Wales, to connect with the lines of the Lehigh Valley Transit Company at the latter point. It is estimated that the cost of this line outside of damages for right-of-way will be \$2,000,000.

Tarentum, Brackenridge & Butler Street Railway, Tarentum, Pa.—Bids have been asked by this company for the construction of its line from Tarentum to Birdville. It will be extended eventually to Freeport. Surveys have been made and work will begin as soon as the weather permits. McKinstry Griffith, president. [E. R. J., April 8, '11.]

Waynesburg & Blacksville Street Railway, Waynesburg, Pa.—This company will award the contract within the next month for building its 13-mile electric railway between Waynesburg and Blacksville. Samuel Eakin, Wadestown, W. Va., president. [E. R. J., Mar. 11, '11.]

Sioux Falls (S. D.) Traction Company.—Two extensions will be built by this company in Sioux Falls, one to the cemetery on the east and another to a new park on the west.

Nashville-Gallatin Interurban Railway, Gallatin, Tenn.—Within six weeks contracts will be awarded by this company for building its railway between Nashville and Gallatin. H. H. Mayberry is interested. [E. R. J., Feb. 25, '11.]

Utah Light & Railway Company, Salt Lake City, Utah.—This company is making arrangements for building several extensions in Salt Lake City.

Spokane (Wash.) Traction Company.—This company will begin work soon building extensions on North Madison Street and North Howard Street in Spokane. It expects to spend \$60,000 on construction work.

***American Undercurrent Company, Ellenboro, W. Va.**—This company is making plans for building an electric railway to connect Ellenboro, St. Mary's and Pennsboro. It will also build a power plant near Ellenboro.

SHOPS AND BUILDINGS

Connecticut Company, New Haven, Conn.—This company has begun the construction of its new car house on State Street and James Street, in New Haven. The Berlin Steel Company had the contract for the steel to be used in the construction. [E. R. J., Feb. 4, '11.]

Tampa (Fla.) Electric Company.—Stone & Webster Engineering Company, Boston, Mass., will at once proceed with the building of new car houses on block one, Toland subdivision, near the Hillsborough River, in Tampa. The cost is estimated to be about \$150,000. [E. R. J., Feb. 18, '11.]

Ft. Wayne & Northern Indiana Traction Company, Ft. Wayne, Ind.—This company is considering plans for building new car houses and repair shops in Ft. Wayne. Arthur H. Mohr, Ft. Wayne, secretary.

Wichita Railroad & Light Company, Wichita, Kan.—This company will build a car house and repair shop on Waco Avenue, between First Street and Second Street, in Wichita, in the near future. The cost is estimated to be about \$100,000.

Great Falls (Mont.) Street Railway.—This company will place contracts during the next few weeks for building a new car house and repair shops in Great Falls. The structure will be 88 ft. x 168 ft. E. I. Holland, Great Falls, general manager.

Piedmont & Northern Railway, Charlotte, N. C.—It is reported that this company is considering plans for building its car house and repair shops in Greenville, S. C.

Dayton & Troy Electric Railway, Dayton, Ohio.—It is reported that this company will build a new car house. The structure will be one-story, of concrete construction.

Fairmont & Clarksburg Traction Company, Fairmont, W. Va.—This company is making plans for building a new car house and repair shop in Clarksburg. The structure will be 65 ft. x 200 ft., and will accommodate thirty cars on five tracks. The repair shop will be erected on one side of the car house, and will be 20 ft. x 80 ft. The buildings will be of brick and steel construction. James O. Watson, Fairmont, general manager.

POWER HOUSES AND SUBSTATIONS

Geary Street, Park & Ocean Railroad, San Francisco, Cal.—This company is considering plans for building a new power house at North Beach.

Escanaba (Mich.) Traction Company.—This company will construct a second power dam, and develop 2500 hp, on the Escanaba River.

Nebraska Transportation Company, Omaha, Neb.—It is reported that this company will build its new power house near Elk City, on the Platte River, capable of generating 21,000 hp. C. W. Baker, Omaha, president.

Buffalo, Lockport & Rochester Railway, Rochester, N. Y.—This company has ordered one 400-kw rotary converter, transformers and switchboard from the General Electric Company.

Jamestown (N. Y.) Street Railway.—Work has been begun by this company on an addition to its power station at the end of West Eightieth Street, in Jamestown. The old portion of the power station will be razed and an up-to-date structure erected in its place.

Metropolitan Street Railway, New York, N. Y.—This company has ordered one 150-kw engine-driven generator from the General Electric Company for its Ninety-sixth Street power station in New York.

Dayton & Troy Electric Railway, Dayton, Ohio.—A joint power house for this company and the Oakwood Street Railway, Dayton, will be built at Tipp City. Work on the details will begin at once. The cost is estimated to be about \$150,000. R. A. Crume, Tippicanoe City, purchasing agent. [E. R. J., March 4, '11.]

Warren & Jamestown Street Railway, Warren, Pa.—The Warren Construction Company has begun the erection of a substation for this company in North Warren. A substation at Fentonville is also being built.

Columbia Electric Street Railway, Light & Power Company, Columbus, S. C.—This company has ordered, through J. G. White & Company, New York, one 2500-kw turbo-generator from the General Electric Company.

Manufactures & Supplies

ROLLING STOCK

Davenport & Muscatine Railway, Davenport, Ia., will purchase several new cars later in the year.

Lincoln Railway & Light Company, Lincoln, Ill., has ordered one double-truck closed car from the American Car Company.

Colorado Springs & Interurban Railway, Colorado Springs, Col., is building seven closed trailer cars in its own shops.

Second Avenue Railroad, New York, N. Y., has ordered ten double GE-216 motor equipments from the General Electric Company.

Lehigh Valley Transit Company, Allentown, Pa., is considering the purchase of ten cars. Details for this equipment have not yet been decided upon.

Marquette County Gas & Electric Company, Ishpeming, Mich., has purchased one set of Brill Eureka maximum traction trucks and two GE-80 motors.

New York, Westchester & Boston Railway, New York, N. Y., has ordered one gasoline electric equipment from the General Electric Company for use on a construction car.

Third Avenue Railroad, New York, N. Y., has ordered thirty-five double-motor equipments from the General Electric Company for use on the storage battery cars which it has ordered from The J. G. Brill Company.

Atlantic Coast Electric Railway, Asbury Park, N. J., has ordered three 28-ft. closed motor car bodies, mounted on 27 G-1 trucks, and three 15-seat open motor car bodies on No. 22 trucks, from The J. G. Brill Company.

Indianapolis, Crawfordsville & Western Railway, Indianapolis, Ind., noted in the ELECTRIC RAILWAY JOURNAL of April 8, 1911, as receiving bids for several new cars, has ordered four 35-ft. interurban cars from the Danville Car Company.

TRADE NOTES

American Electrical Works, Phillipsdale, R. I., has removed its New York office to 165 Broadway.

Pressed Steel Car Company, Pittsburgh, Pa., is improving its North Side Pittsburgh plant and installing additional equipment.

Under-Feed Stoker Company of America, Chicago, Ill., has moved its general offices to the eighteenth floor of the Harris Trust Building, Chicago, Ill.

Chicago Pneumatic Tool Company, Chicago, Ill., has enlarged its office in the Fisher Building, Chicago, by acquiring nearly the whole tenth floor.

Ackley Brake Company, New York, N. Y., has received second orders for Ackley brakes from Melbourne, Australia, and Wellington, New Zealand.

Joseph Dixon Crucible Company, Jersey City, N. J., has appointed Sherman Paris to succeed H. S. Snyder in the advertising department of the company.

Wendell & MacDuffie Company, New York, N. Y., in order to take care of increased business, has moved its offices to suite 1131 at 165 Broadway, New York.

American Car & Foundry Company, Wilmington, Del., will erect a steel and concrete structure in Wilmington to replace a frame building. Estimated cost is \$10,000.

John C. Dolph Company, Long Island City, N. Y., has moved its factory from 153 West Avenue, Long Island City, to 317 New Jersey Railroad Avenue, Newark, N. J.

D. P. Chase has resigned as superintendent of the New York Car Wheel Company, Buffalo, N. Y., to become secretary of the Albany Car Wheel Company, Albany, N. Y.

Walpole Rubber Company, Walpole, Mass., announces that E. C. Green has again become connected with the company as general purchasing agent of the consolidated Walpole companies.

Kennicott Company, Chicago, Ill., has moved its sales offices from the sixth to the fourth floor of the Corn Exchange Bank Building. The company will occupy about half of the entire floor.

Upson Nut Company, Cleveland, Ohio, has elected W. A. Hitchcock president of the company to succeed the late Andrew S. Upson. F. H. Rose, assistant treasurer of the company, will succeed Mr. Hitchcock as secretary.

Frank B. Hart, formerly sales manager of the Ohio Steel & Foundry Company, Lima, Ohio, has resigned and organized the firm of Hart, Doane & Hart, Rector Building, Chicago, Ill., dealers in railway and industrial supplies.

W. J. Oliver & Company, Raleigh, N. C., have been chartered with a capital stock of \$200,000 to build electric and steam railroads. Among the incorporators are: W. J. Oliver, Knoxville, Tenn.; Hayden Clement and Thomas J. Jerome, Salisbury.

Gulf & Rio Grande Construction Company, San Antonio, Tex., has been chartered to engage in the railway construction business. Capital stock is \$100,000. Among the incorporators are: A. W. Liliendahl, Robert P. Coom, Albert Tolle and K. Valentine.

Morgan T. Jones has resigned as president and inspecting engineer of the American Bureau of Inspection and Tests, Chicago, Ill., to engage in the same line of business under the title of Morgan T. Jones Company, with offices in the Monadnock Building, Chicago.

Republic Engineering & Construction Company, Columbus, Ohio, has been incorporated to construct electric and steam railways. Capital stock is \$75,000. The incorporators are: John W. Duffy, M. Crosswell, J. W. McPherson, Edwin S. Duffy and Alexander DeWitt.

Haskell & Barker Car Company, Michigan City, Ind., has acquired five city blocks adjacent to its present factory at Michigan City, on which it intends to build a plant for the manufacture of steel cars. The plant will cost \$1,250,000. The company now manufactures wood cars exclusively.

Spencer Construction & Equipment Company, Rockport, Ind., has been incorporated with an initial capital stock of \$25,000, to construct and equip electric and steam railroads, telephone and telegraph lines, bridges, power plants, etc. Among the directors are: Benjamin F. Hoffman, Robert S. Crowder, John G. Rinslid, Rockport; E. C. Cox and H. C. Watkins, Louisville, Ky.

Pressed Steel Car Company, Pittsburgh, Pa., has appointed John C. Anderson as mechanical engineer in the sales department of the company in New York, effective May 1, 1911. Mr. Anderson was formerly connected with Westinghouse, Church, Kerr & Company, New York, N. Y. He was graduated from the Sheffield Scientific School and has been connected with the Canadian Pacific Railroad and the Boston & Maine Railroad.

Union Steel Casting Company, Pittsburgh, Pa., at the annual meeting of the stockholders on April 18, 1911, authorized the increase in capital stock of the company from \$1,500,000 to \$2,500,000. The proceeds of the stock will be used to erect an addition on a site adjoining the ground recently purchased between the Allegheny River and the Allegheny Valley Railroad, the property being 527 ft. x 530 ft. The addition will double the capacity of the present plant.

F. N. Speller, metallurgical engineer of the National Tube Company, Pittsburgh, Pa., was to read a paper on locomotive boiler tubes on Friday evening, April 28, at the monthly meeting of the Pittsburgh Railway Club. In the afternoon the National Tube Company was to invite the members of the club to visit the Ellwood City plant, where they would have an opportunity to observe the manufacture of Shelby cold-drawn steel tubes and Shelby hot-rolled seamless steel tubes.

Boss Nut Company, Chicago, Ill., has arranged for the United States Steel Corporation to manufacture the Boss nuts at the Joliet, Ill., plant. J. A. McLean, formerly with the American Arch Company, New York, N. Y., has joined the sales department of the Boss Nut Company, with headquarters in Chicago. The Adreon Manufacturing Company, St. Louis, Mo., has been appointed Southwestern representative of the company. A branch office has been opened recently in the Candler Building, Atlanta, Ga.

United States Electric Company, New York, N. Y., has received orders from the Canadian Pacific Railroad for 255 Gill selectors, from the Seaboard Air Line for selectors

for seventy-four telephone stations and from the Atlantic Coast Line for eighty-eight stations. The Cincinnati, New Orleans & Texas Pacific Railway has completed the construction of a telephone train-dispatching circuit paralleled by a local message telephone circuit on its second district, which extends from Danville, Ky., to Oakdale, Tenn., 134 miles.

Power Specialty Company, New York, N. Y., has received orders from the following companies, among others, for Foster superheaters: Cleveland Electric Illuminating Company; Cleveland, Cincinnati, Chicago and St. Louis Railroad; Solvay Process Company; Milwaukee Electric Railway & Light Company; Winnipeg Electric Railway; New York, New Haven & Hartford Railroad at its Waterbury and Zylonite plants; Stone & Webster Engineering Corporation, in the plants of the Minneapolis General Electric Company; Jacksonville Electric Light Corporation, and the El Paso Electric Company, which will install a total of 45,060 hp in boilers. With one exception these contracts are all from previous users of Foster superheaters and in many cases the contracts represent from the fifth to the fifteenth repeat order.

William S. Turner, late Northwestern manager of W. S. Barstow & Company, has opened an office in the Spalding Building, Third and Washington Streets, Portland, as consulting engineer. Mr. Turner is prepared to furnish plans and specifications for electric railways, lighting and power plants, hydroelectric developments and power transmission systems, and will undertake the supervision of the construction of such systems. He will also make examinations and reports on existing or projected engineering works, estimates of the cost of construction and earning capacity and valuations of physical property. Mr. Turner is a member of the American Institute of Electrical Engineers and has had an active experience of twenty-five years as an electrical engineer in the United States and abroad. His biography was published in the issue of this paper for April 2, 1904.

ADVERTISING LITERATURE

Richard J. Flinn, West Roxbury, Mass., is mailing a circular descriptive of the Flinn differential steam trap.

MacGovern, Archer & Company, New York, N. Y., have issued a special list of engines, condensers, pumps and heaters which they have ready for immediate shipment.

Burton W. Mudge & Company, Chicago, Ill., are mailing a circular which describes and illustrates the Adams motor car. It also contains specifications for this type of car.

Bishop Gutta-Percha Company, New York, N. Y., has printed a 20-page booklet entitled "Economic Car Wiring," which discusses the merits of Paraxel insulated wire.

Reinforced Rail Joint Company, St. Louis, Mo., has issued a booklet which describes and illustrates the three types of Roach rail joints, viz., regular track joint, insulated joint and combination joint.

Ohio Brass Company, Mansfield, Ohio, has printed the "O-B Bulletin" for March-April, 1911, which contains among others the following articles: "Practical Talks on O-B Insulators," "Some Interesting Overhead Construction," "A New Live Adjustable Cross-Over" and "Tomlinson M. C. B. Car Coupler."

Sangamo Electric Company, Springfield, Ill., is distributing a 24-page bulletin describing the construction, principle of operation and application of its improved type H induction watt-hour meter. The illustrations, which show a radically new type of magnetic circuit, will be of particular interest to electrical engineers interested in alternating-current measurements.

General Electric Company, Schenectady, N. Y., has issued bulletins describing its type F oil switches. Bulletin No. 4821 deals with switches for use on circuits the voltage of which does not exceed 15,000, and No. 4823 refers to switches designed for voltages of from 22,000 to 110,000. Bulletin No. 4822 illustrates and describes the GE-98 railway motor which was designed to meet the demands of heavy city and suburban service, and is suitable for either two or four-motor equipments. The motor is rated at 50 hp. The publication contains dimension diagrams, characteristic curves, a table of schedule speeds and a form for a prospective customer to fill out and forward to the company when desiring further information on this motor.