

Electric Railway Journal

A CONSOLIDATION OF

Street Railway Journal and Electric Railway Review

VOL. XXXIII.

NEW YORK, SATURDAY, JUNE 12, 1909

No. 24

PUBLISHED EVERY SATURDAY BY THE

McGraw Publishing Company

James H. McGraw, President. J. M. Wakeman, 1st Vice-president.
A. E. Clifford, 2d Vice-president. C. E. Whittlesey, Sec. and Treas.

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NEW YORK, 239 WEST THIRTY-NINTH STREET.

CHICAGO: Old Colony Building.

PHILADELPHIA: Real Estate Trust Building.

CLEVELAND: Schofield Building.

LONDON: Hastings House, Norfolk St., Strand.

Cable Address, Stryjourn, New York; Stryjourn, London—Lieber's Code. (P)

Entered at the New York Post Office as Second Class Mail Matter.

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TERMS OF SUBSCRIPTION

United States, Hawaii, Puerto Rico, Philippines, Cuba, Mexico and Canal Zone.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also special daily convention issues published from time to time in New York City or elsewhere), postage prepaid...\$3.00 per annum

Single copies.....10 cents

Combination Rate, in connection with American Street Railway Investments (The "Red Book"—Published annually in May; regular price, \$5.00 per copy).....\$6.50 per annum

CANADA: extra postage.....\$1.50 per annum

To All Countries Other Than Those Mentioned Above.

ELECTRIC RAILWAY JOURNAL (52 weekly issues and also daily editions as above), postage prepaid.....\$6.00 per annum
25 shillings. 25 marks. 31 francs.

Single copies.....20 cents
Foreign subscribers may remit through our London office.

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DATE ON WRAPPER shows the month at the end of which the subscription expires. The sending of remittances for renewal prior to that date will be much appreciated by the publishers.

Of this issue of the ELECTRIC RAILWAY JOURNAL 9000 copies are printed.

Change in Date for Denver Convention

Official announcement is made of a change in the date for the Denver convention of the American Street & Inter-urban Railway Association and affiliated associations. It has now been determined to hold the convention during the week beginning October 4, instead of two weeks later as was announced originally. The reasons why this change is advantageous and in the interests of the delegates are made plain in the announcement which is published

in another part of this issue. Undoubtedly, as the official statement suggests, many of those who have to travel from Eastern points to attend this convention will want to use the opportunity to go to the Alaska-Yukon-Pacific Exposition at Seattle or to travel to other points on the Pacific coast. The earlier date will permit those who plan an extended trip to take advantage of the excursion rates made by the railroads on account of the Seattle exposition. The change will therefore be of especial interest to delegates east of Denver. While it is still too early to judge definitely of the number who will attend the meeting of the American Association and the allied organizations, all reports indicate that the arrangements, as expected, have aroused widespread interest in the West and plans are under way for a good attendance from various Eastern points.

Shop Bookkeeping

The merchant who opens a store, however small, is pretty certain to provide himself with a day-book and ledger so that he can watch the outgo and income of his business. In fact, some kind of accounting is considered a necessity in every commercial enterprise, yet it is often neglected in electric railway shops despite the fact that the maintenance department handles material of enormous value. If it is urged that a comprehensive and accurate system of shop accounting should be established, the responsible management may plead that the best master mechanic makes the poorest bookkeeper. This excuse assumes that the shop superintendent himself would be pestered by many clerical details and his efficiency impaired in proportion. It is perfectly feasible, however, to have all necessary detail work done by a low-salaried shop clerk, leaving only the actual analysis of the figures to the master mechanic. If there are several shops, it would be even better to concentrate all records of importance at the executive offices where all cost and mileage calculations could be made.

A detailed record of equipment life and troubles is absolutely necessary if maximum economy is desirable in the first cost and the maintenance expense of apparatus. Without the aid of statistics, the master mechanic would be unable to recommend the purchase of material except on the basis of his personal technical knowledge. Unless he is further supplied with the cost per mile figures and other data embodying experiences throughout the system, he is in no position to give the company a properly-grounded opinion. If he is asked to decide on carbon brushes, he should have before him a record of mileages, breakages and rough commutators under like service conditions; if the subject is the choice of a bearing metal, he should know the life of each alloy and its relation to hot journals and dropped armatures; if it is a question of insulation, he

should be able to report on the limiting values of each compound; and so throughout the list, he should always have the facility to survey every side of the problem presented to him. In short, no railway is getting the full value of its expenditures unless it gives its maintenance experts every opportunity to reach just conclusions on the relative merits of the costly equipment and material placed in their charge.

Oil Engines

Although little is heard of oil engines in this country they seem to be used to a considerable extent abroad, and a paper comparing this type of engine and steam and gas engines was recently presented at a meeting of the British Institution of Electrical Engineers by the late manager of the Calcutta tramways. This road has had in use a 1000-hp plant for almost a year without a hitch of any kind and the paper as a whole gives the oil engine an excellent character. Its thermal efficiency at full load when burning petroleum of about 18,500 b.t.u. per pound is in the neighborhood of 45 per cent, and its mechanical efficiency about 70 per cent, making the total thermodynamic efficiency in the neighborhood of 30 per cent. The oil engine can be started up by compressed air within a few minutes of the time that work is expected of it, so that there are practically no more costly standby losses, and the labor in connection with fuel handling and boiler or producer plant is eliminated. It is also said that there is much less to get out of order in an oil-engine plant than with a steam or gas-engine station, an important consideration in places where skilled labor is scarce or expensive. Under these circumstances it is interesting to note that makers are prepared to build engines in sizes up to 4000 hp, although 800 hp is the largest yet constructed. The discussion brought out no serious objections to the arguments presented except the possible fluctuations in the price of fuel oil. But this would probably be of greater force in Great Britain than in this country.

Uncollected Taxes in New York

Ten years ago a strenuous Governor of New York State called the Legislature together in special session, to enact a bill which constituted a novel departure in corporation taxation. The public service companies, it was said, were the possessors of property of enormous value, called franchises, which had been acquired for the most part at a time when the future value of franchises was not fully understood. It made no difference that fares, rates and service had become adjusted to existing conditions, or that new companies had been organized to conduct business on what their stockholders naturally expected to be stable conditions of taxation. Public opinion had been accelerated to such an anti-corporation attitude that the legislators could not stand the pressure, and the bill was passed. The principal advocate of that measure has long passed from the gubernatorial chair, and is now hunting lions in Africa. But the franchise taxes, still largely uncollected, remain in New York State, a specter to frighten intending investors and discourage improvements. The adjudication of these taxes has been referred from year to year by the attorney general to various referees, and a recent list of the

cases in New York City still under consideration occupies over two columns in small type in one of the New York papers. It includes most, if not all, of the principal public service corporations, electric lighting, gas, steam and electric railway in New York, and stands as a warning to future lawmakers against impracticable and confiscatory legislation.

Subway and Elevated Traffic Changes

Comparative ticket sales on the Subway and Elevated systems of Manhattan in 1907 and 1908, published in another part of this issue, show tendencies of travel which are of interest to students of rapid transit movements in great cities. The significance of the figures lies in the well-understood tendency in New York toward an increase in subway traffic and decrease in travel on all of the various elevated lines.

The subway carried 220,991,212 passengers in 1908, an increase of 38,431,222, or 21.1 per cent over 1907. The elevated lines carried 273,855,136 passengers in 1908, a decline of 15,944,440, or 5.5 per cent from the record in the preceding year. All four of the elevated lines showed decreases, ranging from 7,433,385 in the case of the Third Avenue line to 2,289,274 on the Sixth Avenue line. The percentages of decrease in the number of passengers carried on the elevated lines, as compared with the preceding year, were as follows: Second Avenue line, 7.9 per cent; Third Avenue line, 5.7 per cent; Sixth Avenue line, 2.7 per cent; Ninth Avenue line, 8.8 per cent. The percentage of loss in travel was therefore the greatest in the case of the Ninth Avenue line, and lowest on Sixth Avenue.

The heaviest business on the subway division was at the Brooklyn Bridge Station, where nearly 17,000,000 tickets were sold in 1908; this is a decline of over 6,000,000 from the previous year and results from the opening of the Brooklyn subway extension. On the elevated division the principal point of business was at the City Hall Station on the Third Avenue line, where the number of tickets sold in 1908 was in excess of 11,000,000. No other elevated station approached this one in the volume of business handled. Some stations of abnormally light traffic also appear in the record. Total sales at the 215th Street Station, on the Broadway branch of the subway, in 1908, were 103,743 tickets, indicating a gross revenue for the year from this station of \$5,187. The smallest station on the elevated division was at 127th Street on the Second Avenue line, where 291,801 tickets were reported sold in 1908, indicating a gross revenue of \$14,590.

Elevated lines on Manhattan Island have passed through varying degrees of public favor. They lost traffic when the surface roads were first electrified, but regained it when electricity was substituted for steam locomotives as the motive power on the elevated. It is urged by the Interborough Rapid Transit Company that permission be given for the installation of express tracks on the Second and the Third Avenue elevated lines; the addition of these facilities would undoubtedly attract some business. The tendency to decrease in the patronage of the elevated lines may be withstood to some extent if the authorities will grant the company the right to provide more rapid transit on the elevated lines mentioned.

Transmitting Train Orders

We referred in these columns, last week, to some of the changes in the interurban code of rules of the American Street and Interurban Transportation and Traffic Association which were made by the committee at the conference held in Washington, D. C., on May 25. The revision of the rules relating to the movement of trains by train orders resulted in changes of a far more radical nature than were made in any of the rules which precede them in the book. This section of the interurban code as originally drafted departed widely from the American Railway Association standard code owing to the fact that it was based on the use of the telephone in transmitting train orders direct from the dispatcher to the train crews, whereas, the American Railway Association code assumes the use of the Morse telegraph with operators at train-order stations through whom the orders are transmitted and by them delivered to the train crews. The desire of the majority of the members of the committee to adopt, as far as possible, the wording and procedure of the American Railway Association code was, no doubt, responsible for the major part of the changes made which bring the two codes more nearly in accord in this important respect.

Telephone train despatching is a comparatively new art, the first recorded instance of its use being on the Boston, Revere Beach & Lynn Railroad in 1892. It involves some chances for errors not common with telegraph dispatching and these must be guarded against in new ways. The general practice on interurban electric railways of having the train crews communicate directly with the dispatcher also requires a method of procedure to be outlined which differs from that best safeguarding the transmission of orders through an agent.

In the original draft of the interurban code rule No. 256, prescribed a method which required both members of the train crew to leave the car to call the dispatcher and alternated in a confusing manner the duties and responsibilities of the motorman and conductor. The revised rule is in every respect an improvement over the original. The motorman reports to the dispatcher, writes the order on the proper blank and repeats it back to the dispatcher, who gives an O. K. if correct. This completes his part of the responsibility. The conductor then repeats the order from the written copy and if correct the dispatcher returns the "complete." When the conductor has signed the order with the time and his initials his responsibility ends and the order is in full force. This is a clear division of duties and provides the double check of two voices repeating the order, and having the second repetition read from the written copy. It is largely a question of expediency as to whether the motorman or the conductor first receives and writes the order, the important point being that both repeat it back to the dispatcher before the "complete" is given. The psychological question of whether the strongest impression is made on the mind of the motorman who first receives and writes the order or on the mind of the conductor who afterwards repeats it from the written copy is hardly worth arguing over. One objection, however, which might be raised against having the motorman write the order is that the conductor's handwriting is usually more legible because his fingers are not cramped and stiff

from gripping the controller handle. In this connection mention can be made of the practice of at least one road having the conductor and motorman signal each other on approaching each siding. This serves as a reminder against running by a meeting or passing point.

The addition to rule No. 258 which was adopted by the committee, we believe, is inadequate and introduces a peculiar conflict with the original paragraph which should be straightened out before the final adoption of the rules by the Association. Rule No. 258, as it originally stood, provided for the agent displaying a stop signal on notice from the dispatcher, and "the motorman and conductor must not pass a station where such signals are displayed without reporting to the dispatcher." The paragraph added provides for the agent receiving and writing the order in advance of the arrival of the train and delivering it to the train crew without notification to the dispatcher that the order actually has been delivered. The original rule makes it mandatory for the train crew to report to the dispatcher and the additional paragraph permits them to proceed after receiving orders from the agent without calling the dispatcher.

The effect of this rule is practically to nullify the safeguards provided for the use of a form "31" train order, which was adopted together with form "19" in place of the printed order form originally included in the code. The American Railway Association code provides that the "31" order shall be used when the signatures of those to whom it is addressed are desired, as for example in fixing a meeting point for two trains, and "complete" is not given by the dispatcher until after it has been read, signed and the initials of those who have signed it have been repeated back. The dispatcher thus has positive assurance that the order has been delivered to the proper persons. The rule adopted by the conference places the entire responsibility of receiving and delivering the order on the agent and the dispatcher has no notification that the order actually has been delivered. At the risk of making the rules more complicated we believe it would have been wiser to have incorporated the substance of rules Nos. 210 and 211 of the American Railway Association code.

The printed form of train-order blank with spaces left for writing in the orders, which was included in the rules as submitted to the association last fall, has been abandoned in favor of the two standard forms, Nos. 19 and 31 of the American Railway Association. The only argument in favor of the printed blank is that it saves time in writing the order. On the other hand there are serious objections to it which were voiced by some of the railway managers present at the conference. The blank has printed spaces for writing seven different forms of orders prescribed. It has happened that train crews have received orders of form A and form L simultaneously and entered them on one blank. The meet order (form A) at the top of the blank has been observed, but the order of annulment (form L) at the bottom has been overlooked. It is difficult to write an order legibly in the restricted space allowed on the printed blank and there is a difference of opinion as to the possible saving of time by its use. The standard blank forms, with ruled lines to prevent errors in reading across, we believe are a decided improvement.

STANDARDIZATION IN BROOKLYN—CLASSIFICATION OF ROLLING STOCK AND POWER EQUIPMENT PRACTICE

The broader aspects of the car standardization and maintenance problem before the Brooklyn Rapid Transit Company have been dealt with in the first article in this series printed in the May 29 issue. It is now in order therefore to present a detailed classification of the rolling stock as it exists to-day with descriptions of the advances made in the power equipments for the elevated and surface cars. Reference will also be made in this article to the recent changes in gear and pinion ratio and to the graphic gear mileage records.

CAR CLASSIFICATION ON WEIGHT BASIS

A few months ago the mechanical department divided all of the elevated and surface cars according to weight to determine whether it would be feasible to keep equipment records on a ton-mile basis. The ton-mile is admittedly the logical unit of comparison where speed conditions do not vary much, but it seemed doubtful that it could be applied to the diverse types operated in Brooklyn. Nevertheless, a careful analysis of the rolling stock has demonstrated that this advance over the mileage method is possible, although special allowances may have to be made for variations in service.

WEIGHT CLASSIFICATION OF ELEVATED CARS

As shown in the accompanying schedule the elevated passenger cars have been divided by weight into four classes, E-1, E-2, E-3 and E-4, weighing respectively 19, 34, 36 and 39 tons. The approximate average weight per seated passenger in the E-1 trailer is 679 lb. The least average weight per passenger on the motor cars is shown by class 1000 (built originally for summer operation) with 1076 lb. and the highest by class 1400 with 1352 lb. This gradual increase in the weight per passenger is due to the adoption of a heavier car construction and more powerful motive apparatus. The pressed-steel, semi-convertible car now in service makes a very favorable showing with its average of 1288 lb., although its equipment does not differ from class 1400.

The cars in class E-1 represent the original steam coaches shown in Fig. 1, which were built up to 1893 and are now used as trailers with an average seating capacity of 50. Class E-2 consists partly of steam coaches converted to motor cars. There are some slight variations in the design and weight of these converted motor cars with the old-type Westinghouse drum control, but the center-door type shown in Fig. 2 is typical of a number still in service. It may be added that the center doors are not used and permanent seats have been provided in front of the same. The cars grouped in class E-3 consist of type 600 closed car, built in 1901, type 1000-1100 semi-convertible and convertible cars, built in 1903, and type 1200 semi-convertible, built in 1904. One of the type 1200 cars equipped with Westinghouse turret control is shown in Fig. 3. The 1000 type, also forming a part of class E-3, and shown in Fig. 4, is the company's first convertible motor car built in 1903 as an open car intended for the Coney Island traffic, but later provided with removable panels and ventilators. Class E-4 includes the more substantial convertible car of the 1300 type, introduced in 1905, which is illustrated in Fig. 5. The 1400 type included in the last group is a semi-convertible car which was fully described in the STREET RAILWAY JOURNAL of Feb. 8, 1908. Classes 1200 and 1400 are substantially alike except that the former has two 150-hp motors and the latter two 200-hp interpole motors.

WEIGHT CLASSIFICATION OF SURFACE CARS

The surface cars have been divided into six "S" classes, corresponding to respective weights of 12, 14, 17, 18, 20 and 27 tons. The weight per seated passenger on closed cars has steadily risen from the 738 lb. in classes 300, 500

Class.	Car Nos.	Number of cars.	Type of cars.	Seating capacity.	Weight of cars, light, in lb.	Weight with pass.††
E-1	1-6, 8-125, 127-271	269	closed trailer	* 50	* 33,939	20
	600-632, 683	34	closed motor	* 51	* 61,138	
E-2	700-743, 745-758	58	"	50	62,400	34
	800-820, 822-832	32	"	50	61,500	
	833-858	26	"	50	61,620	
	859	1	"	50	64,200	
	900-935	36	"	52	61,200	
	936	1	"	52	61,950	
E-3	1000-1078, 1080, 1082-1119	118	convertible motor	60	†64,548	36
	1079, 1081	2	semi-convertible motor	51	67,350	
	1200-1299	100	semi-convertible motor	53	67,350	
	633-682	50	closed motor	52	67,050	
E-4	1300-1399	100	convertible motor	62	†73,230	39
	1400-1499	100	semi-convertible motor	53	71,059	
	998	1	all-steel, semi-convertible motor	56	70,660	

*Average.
 †Weights are of cars equipped with sash for winter service.
 ††Average weight, in even tons, with 75 per cent of seated passenger load and 150 lb. per passenger.

Schedule of Weights—Elevated Passenger Cars

and 700 to the 1085 lb. of cars 4550-4599. The weights per passenger on the open cars vary from 360 lb. in classes 1800 and 2000 of single-truck cars to 407 lb. in classes 1200, 1400, 1600 of double-truck cars.

Class	Car Numbers	Number of cars	Type of cars	Seating capacity	Actual weight of cars, light, in lbs.	Average weight in even tons, with 75% of seated pass. load at 150 lbs. per passenger	Average weight per seated passenger	
S-1	100-176.....	77	Single truck, closed....	30	18,700 ..	623		
	1800-1899, 2000-		"	"				
	2004.....	105	"	open.....	50	18,000	12	360
	2005-2062.....	58	"	"	50	20,000		400
	420-499, 600-699.....	180	Double truck, open....	65	26,460 ..	407		
S-2	800s, 1000s.....	200	"	65	26,460 ..	407		
	1200s, 1400s.....	200	"	65	26,460 ..	407		
	1600-1649.....	50	"	65	26,460	17	407	
	2700, 2703.....	2	"	semi-conv.	38	28,250 ..	743	
	2701, 2702, 2704....	3	"	"	32	28,250 ..	883	
	2705-2718.....	14	"	"	38	28,250 ..	743	
	2719-2764.....	46	"	"	32	28,250 ..	883	
	2766-2799.....	34	"	"	32	28,250 ..	883	
	2900-2914.....	15	"	"	32	28,880 ..	902½	
	2915-2924.....	10	"	"	38	28,880 ..	760	
	2925-2999.....	75	"	"	32	28,880 ..	902½	
	S-3	3100-3142.....	43	"	32	28,250 ..	883	
3143-3154.....		12	"	32	28,880 ..	902½		
3155-3199.....		45	"	38	30,940 ..	814		
3300-3362.....		63	"	38	30,940	18	814	
3363-3399.....		37	"	38	31,420 ..	826		
3500-3554.....		55	"	38	31,420 ..	826		
200s, 400-419.....		120	Double truck, open....	60	23,070 ..	384		
300s, 500s, 700-786.		254	"	closed....	34	25,100	15	738
788, 1700s, 1900s....		151	"	"	34	25,100 ..	738	
2100s.....		100	"	"	34	25,100 ..	738	
S-4	787.....	1	Convertible.....	36	25,100 ..	697		
	789-795.....	7	Double truck, closed,					
			drop sash.....	32	25,100 ..	784		
	2500-2599.....	100	Double truck, semi-					
			convertible.....	38	35,200	20	926	
S-5	3555.....	1	Double truck, conv'ble.	48	53,100 ..	1,106		
	3556.....	1	"	48	53,100 ..	1,106		
	3700-3799, 3900-		"	"				
	3924.....	125	"	48	49,630 ..	1,034		
	3925-3957.....	33	"	48	49,060 ..	1,022		
	3958-3974.....	17	"	48	47,212 ..	982		
	3975-3999.....	25	"	48	48,520	28	1,011	
	4100-4199.....	100	"	48	50,064 ..	1,043		
	4300-4349.....	50	"	48	51,150 ..	1,066		
	4500-4549.....	50	"	48	50,830 ..	1,085		
	4550-4599.....	50	"	48	52,100 ..	1,059		

Schedule of Weights—Surface Passenger Cars

Typical examples of the surface cars most used in Brooklyn to-day are shown in Figs. 6 to 12, inclusive. Fig. 6 illustrates a single-truck open car with 10 benches built during 1893, 1894 and 1895; Fig. 7, the double-truck, 13-bench open cars of later design; Fig. 8, the semi-convertible

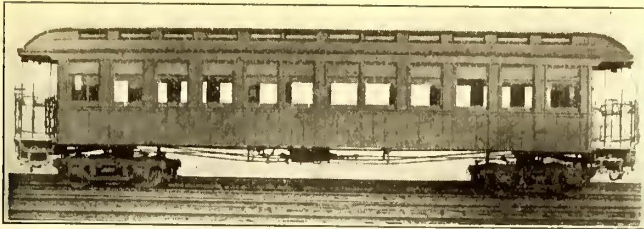


Fig. 1—Brooklyn Rolling Stock—Elevated Steam Car Converted to Electric Trailer

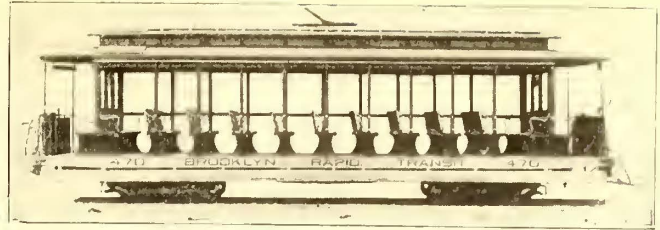


Fig. 7—Brooklyn Rolling Stock—Double-Track Open Car, with Thirteen Benches

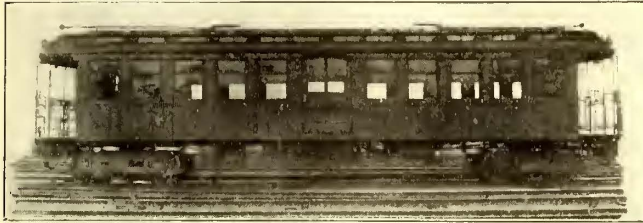


Fig. 2—Brooklyn Rolling Stock—Elevated Steam Car Converted to Electric Motor.

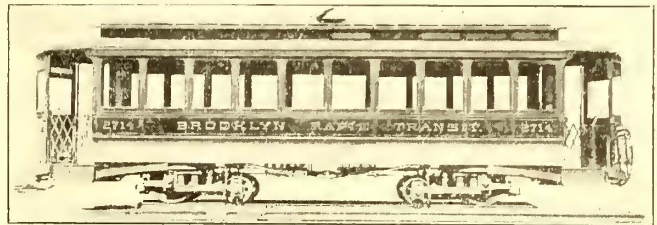


Fig. 8—Brooklyn Rolling Stock—Semi-Convertible Car, with Maximum Traction Trucks, 2700 Type

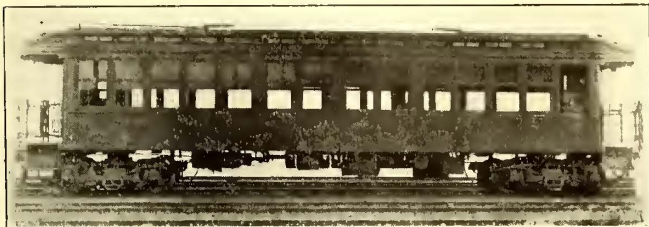


Fig. 3—Brooklyn Rolling Stock—Elevated Motor Car Fitted with Turret Control



Fig. 9—Brooklyn Rolling Stock—Semi-Convertible Car, with Maximum Traction Trucks, 3500 Type

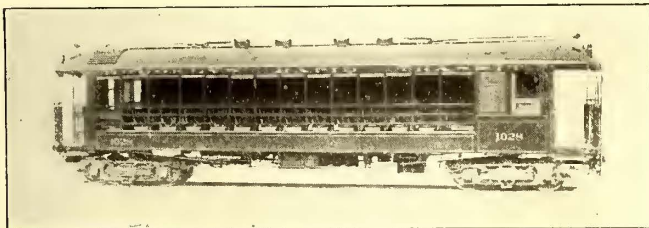


Fig. 4—Brooklyn Rolling Stock—Elevated Convertible Motor Car, Built Originally for Summer Service

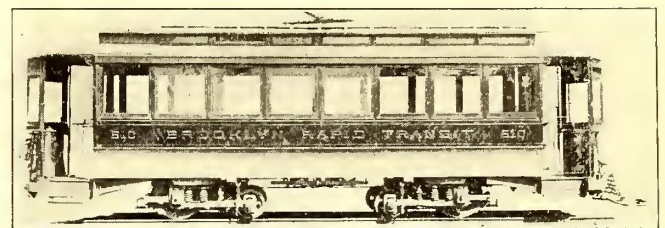


Fig. 10—Brooklyn Rolling Stock—Standard Closed Car with Maximum Traction Trucks

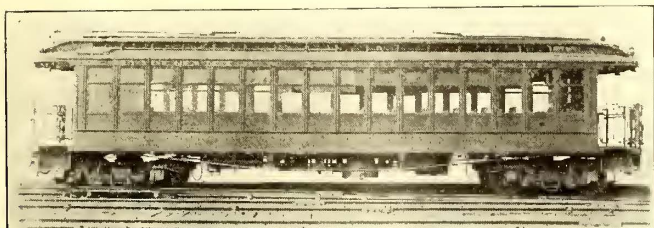


Fig. 5—Brooklyn Rolling Stock—Type 1300 of Elevated Convertible Motor Car

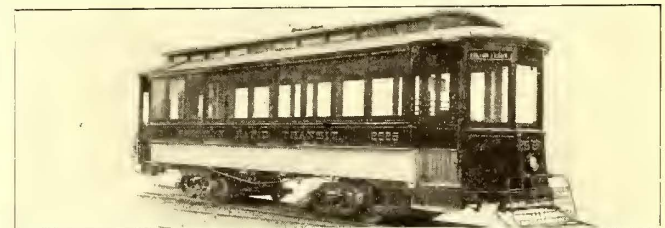


Fig. 11—Brooklyn Rolling Stock—Latest Type of Semi-Convertible Car, with Maximum Traction Trucks

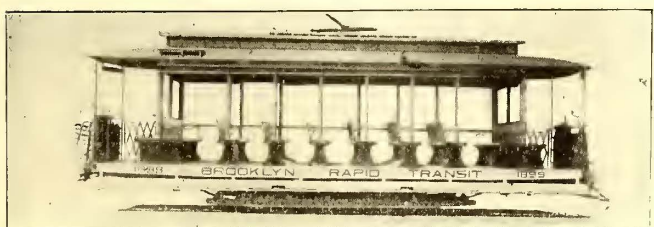


Fig. 6—Brooklyn Rolling Stock—Early Type of Single-Track Open Car, with Ten Benches

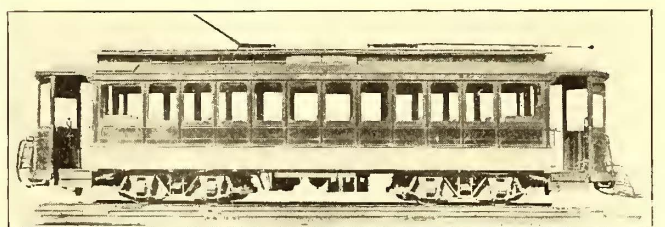


Fig. 12—Brooklyn Rolling Stock—Convertible Cross-Seat Car, with Air Brake Equipment

car built from 1902 to 1904, and Fig. 10, a closed car. Practically all of the single-truck cars carry two 40-hp motors and the double-truck cars two 60-hp motors.

The cars shown in Figs. 11 and 12 deserve special attention, as they represent two contrasting types built in large numbers since 1906. The class 2500 car,* with two 60-hp 926 lb. per passenger and is light enough for hand braking. It is rapid loading also because of longitudinal seating and accelerator doors and consequently is very desirable for rush-hour and Coney Island service. On the other hand, the average ride in Brooklyn is so long that the company thought it would best serve the convenience of its patrons by introducing a cross-seat car of the type shown in Fig. 12, equipped with four 40-hp motors and air brakes. Unfortunately, the clearance conditions in Brooklyn limited the over-all width of these cars to 8 ft. 2½ in., giving an aisle only 22¾ in. wide between the seats. As a result these cars have proved poor loaders. This disadvantage has been partially overcome in the class 4500 car by lengthening the longitudinal seats at the ends, but on the whole the class 2500 car makes just as good schedules with less power and is cheaper to maintain.

CLASSIFICATION ACCORDING TO POWER EQUIPMENT

In view of the extended articles previously published on the standardization of the elevated cars, it will be unnecessary to refer to their motive equipment at this time other than to point out that the company has shown its willingness to have the most advanced apparatus by adopting the Westinghouse 300, 200-hp commutating-pole motor for the class 1400 elevated cars. This represents an increase of fully 100 hp per car over the Westinghouse 50 E, B or L, 150 types previously installed. The new cars also carry the Westinghouse type 251-1-3 control instead of the turret system.

The standardization of the surface department has resulted in reducing the motive equipments to four types in passenger-car service. To attain this desirable end it was necessary to eliminate all GE-800, GE-1000, W. P. 50, Westinghouse 3 and Westinghouse 12 motors. The layout of the motors on the car is shown in the accompany table:

Style of car	Motors	Con-trollers	No. of cars
Convertible	4-40-hp West. 101 B, West. 68 or 4 GE80.	K-28B	452
Semi-convertible with 28-ft. body	2-60-hp West. 81, West. 93-A-2 or GE64.	K-11 and K-28L	554
Closed, double-truck with 25-ft. body	2-60-hp West. 81.	K-11	513
Closed, single-truck 12 and 13-bench double-truck	2 West. 68 permanently on 12-bench cars and equipments from 505 of the 25-ft. closed cars on 13-bench cars.	K-11	77 750
Ten-bench single-truck	2 West. 68.	K-11	163

MOTOR SPECIFICATIONS FOR ELEVATED AND SURFACE LINES

The motors which have been most recently adopted by the Brooklyn Rapid Transit Company are the following: West. 300 commutating pole motor for elevated lines; West. 93 A-2 motor for two-motor surface equipments, and GE80 and West. 101 for four-motor surface equipments. In view of this selection, the conditions which these several motors must fulfill should be of interest. The following data motors, illustrated in Fig. 11, is semi-convertible, weighs

on each type is taken chiefly from the preliminary specifications prepared by the railway company for the motor maker.

VOLTAGE AND RUNNING CONDITIONS FOR WEST. 300 MOTOR

The West. 300 elevated motor, while rated at 200 hp on 550 volts, operates under variations from 450 volts to 625 volts, the average being approximately 525 volts. It is capable of working on circuits up to 800 volts without producing flashes or sparks from the commutator and brush mechanism greater than the width of one commutator bar. To provide for a special service in conjunction with the Long Island Railroad, the motor has been built for operation on working pressures averaging 625 volts and having a normal maximum of 650 volts. At these voltages there must be no flashing when the greatest loads are such that the temperature rise of the motor does not exceed 75 deg. C. in the windings and 90 deg. C. in the commutator.

Two motors per motor car operate trains made up of motor cars and trailers over the Brooklyn Rapid Transit ele-

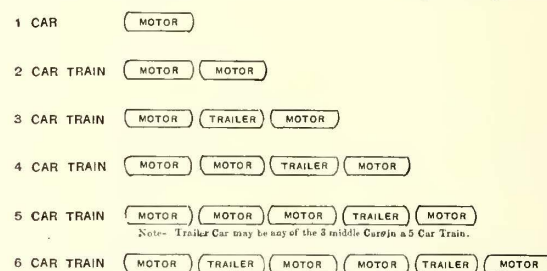


Fig. 13—Brooklyn Rolling Stock—Graphic Record of Elevated Train Make-up

vated system, which includes elevated lines, various surface lines connected thereto, and the Brooklyn and Williamsburg bridges. The most severe grades are one of 3 per cent for 1500 ft. on the Brooklyn Bridge and one of 4.6 per cent for 1100 ft. and 3.88 per cent for 1600 ft. on the Williamsburg Bridge.

The makeup of trains with these equipments varies as follows:

Train	Motor Car	Trailer
1	1	0
2	2	0
3	2	1
4	3	1
5	4	1
6	4	2

The makeup of elevated trains is also shown in one of the accompanying drawings. It may be added that the five-car train formerly had two trailers. The weights, dimensions and capacities of cars approximate the following:

MOTOR CARS	
Weight of car and trucks complete, except motors and control	58,000 lb.
Weight of car completely equipped, empty	72,000 lb.
Weight of car completely equipped, loaded	92,700 lb.
Length of car body	40 ft. 5 in.
Length of car over all	48 ft. 11 in.
Number of seated passengers	53
Number of standing passengers	85
Total capacity	138

TRAILERS	
Weight of car completely equipped, empty	34,000 lb.
Weight of car completely equipped, loaded	56,950 lb.
Length of car body	39 ft. 5 in.
Length of car over all	47 ft. 8¼ in.
Number of seated passengers	52
Number of standing passengers	161
Total capacity	153

The gear ratio of these motors is 19.64 and the accelera-

*See STREET RAILWAY JOURNAL, Nov. 2, 1907.

tion 1.75 m.p.h.p.s. The approximate weight of this motor without gears is 6000 lb., and with the gears and case 6400 lb. The service capacity of these equipments is such that they meet the following test conditions and requirements: Assume that the test train consists of five cars, three motor cars and two trailers.

- Car wheels, 34 in. diameter.
- Number of motors in train, 6.
- Load, 27 tons per motor.
- Length of run between stops, 1600 ft.
- Duration of stops between runs, 15 seconds.
- Schedule speed, including stops, 14.5 m.p.h
- Line potential, 525 volts.
- Test made on a level, tangent track.
- Rate of braking, 1.5 m.p.h.p.s.

The above operating cycle must be repeated continuously during a period of 18 hours, with a temperature rise in the motors not exceeding 60 deg. C. in the windings and 80 deg. C. in the commutators, above the surrounding atmosphere.

REQUIREMENTS OF WEST. 93 A-2 MOTOR FOR TWO-MOTOR EQUIPMENTS

The 93 A-2 motors used two per surface car are rated at 60 hp at 500 volts. The weight of a complete motor with gears and case is about 3500 lb. These two-motor equipments are adapted for the operation of double-truck surface cars, 38 ft. long over all, mounted on maximum-traction trucks, and weighing, without motors, control equip-

approximately 40,000 lb., without the motors, K-28 B control equipment and passengers. The car has seating capacity for 48 passengers and standing room for 38. Both motors are of the closed type, with nose suspension, and weigh about 2800 lb. each, including the gearing. The bottom half of the field frame is arranged to open downward for inspection and renewals.

The heaviest grade over which these equipments operate is 5.3 per cent for 1200 ft., this being a portion of a continuous grade about 4000 ft. long. The motors when geared 16:70 are capable of accelerating a carload of 7 tons per motor at the rate of 1.5 m.p.h.p.s. from rest to the equivalent maximum speed, without injurious sparking, and under level track conditions there is no injurious sparking of the motors at any time during 25 successive repetitions of this starting cycle.

The service capacity of the equipments is such that they meet the following conditions and requirements in a test to be made on single cars without trailers:

- Wheel diameter, 33 in.
- Load, 7 tons per motor.
- Stops per mile, 10.
- Duration of stops, 8 seconds each.
- Schedule speed, including stops, 9 m.p.h.
- Line potential, 525 volts, average.
- Rate of braking, 1.5 m.p.h.p.s.
- Track, level and tangent.

The above operating cycle must be repeated continuously

Average No. of cars operated during the year 1907.	Average weight of car with load in tons.	Type of motors.	No. of motors per car.	Total mileage a year.	Old gear ratio, speed and current consumption.					New gear ratio, speed and current consumption.									
					No. of teeth in pinion.	No. of teeth in gear.	Gear ratio.	Maximum speed, m.p.h.	Current consumption in watt-hours per ton-mile.	No. of teeth in pinion.	No. of teeth in gear.	Gear ratio.	Per cent. of increase in gear ratio.	Maximum speed, m.p.h.	Decrease of speed in m.p.h.	Current consumption in watt-hours per ton-mile.	Per cent. of decrease in current consumption.	Per cent of equipment affected.	
327	29	West.	101	4	7,886,913	16	68	4.25	27	177.2	14	70	5.00	17.6	23.5	3.5	157.0	11.39	21.06
112	19	West.	93	2	2,701,328	19	68	3.58	31.5	195.5	17	70	4.12	15.1	28.75	2.75	178.2	8.85	7.22
754	19	West.	81	2	18,185,726	18	68	3.77	31	188.5	16	70	4.38	16.17	28.25	2.75	171.8	8.86	48.55
143	..	West.	68	2	3,449,017	14	68	4.86	22	.....	14	68	4.86	0.00	.....	0.00	.....	0.00	9.2
92	19	G. E.	64	2	2,218,948	19	68	3.58	25.5	148.0	17	70	4.12	15.1	21.5	4.00	140.0	5.41	5.92
125	29	G. E.	80	4	3,014,875	17	69	4.06	30	167.0	16	70	4.37	7.9	29	1.00	164.0	1.79	8.05

Alteration of Gear Ratio—Surface Passenger Equipment

ment and passengers, approximately 28,000 lb. The car has a capacity of 39 passengers seated and 44 standing. The heaviest grade is one of 5.3 per cent for 1200 ft., this being a portion of a continuous grade of approximately 4000 ft. length. The motors when geared 17:70 accelerate a carload of 12 tons per motor at the rate of 1.5 m.p.h.p.s. from rest to the equivalent maximum speed without injurious sparking. The service capacity of the equipments is such that they meet the following conditions and requirements in a test made on single cars without trailers:

- Wheel diameter, 33 in.
- Load, 11 tons per motor.
- Stops per mile, 10.
- Duration of stops, 8 seconds each.
- Schedule speed, including stops, 9 m.p.h.
- Line potential, 525 volts, average.
- Rate of braking, 1.5 m.p.h.p.s.
- Track, level and tangent.

The above operating cycle must be repeated continuously during a period of 12 hours, with a temperature rise in the motors not exceeding 65 deg. C. in the windings and 80 deg. C. in the commutators above the surrounding atmosphere.

REQUIREMENTS FOR GE80 AND WEST. 101 FOUR-MOTOR EQUIPMENTS

The double-truck convertible cars carry four 40-hp, 500-volt motors, either GE80 or West. 101. The cars are 42 ft. 6 in. long, are mounted on Baldwin trucks, and weigh

during a period of 12 hours, with a temperature rise in the motors not exceeding 65 deg. C. in the windings and 80 deg. C. in the commutators above the surrounding atmosphere.

INCREASE IN GEAR RATIO

Early in 1907 the mechanical department made a detailed investigation of the speed question in its relation to power consumption and motor heating. This inquiry showed that the period when cars could operate at maximum speed was generally so brief that certain increases in the gear ratio could be made without affecting the schedules, more especially as the drop in maximum speed would be compensated for by higher acceleration. It was also understood that the saving in power would be accompanied by a decrease in the motor heating, which was then exceeding desirable limits.

The accompanying table gives a list of the motors that were in use on the surface division when the alterations in gear ratio were determined upon, and also presents comparisons in power consumption and speeds for the different ratios. The mileage shown in the table was determined by taking the average miles per car for the year 1906 and multiplying it by the estimated average number of cars planned for operation in 1907. The current consumption figures were taken from speed-time curves computed by the Westinghouse and General Electric companies for the several gear ratios indicated.

By examining the table it will be noted that the gear ratios of all motors were increased except the Westinghouse No. 68, as the latter was geared 14:68 for the comparatively low maximum of 22 m.p.h. The gear ratios of the other motors were increased 7.9 per cent to 17.6 per cent over the former ones, thereby reducing the maximum speed between 1 m.p.h. and 3.5 m.p.h. The maximum speeds now range from 21.5 m.p.h. with the GE64 equip-

ber, 1907. By April 30, 1909, 1036 surface equipments had been altered out of a total of 2840, and 626 elevated equipments out of a total of 1052.

GEAR AND PINION RECORDS

The mechanical department has made exceptionally thorough researches in gearing, and as the result has changed its metal requirements most materially, as will be detailed in a later article on metal specifications. To assist in ob-

RECORD OF GEAR and PINION WEAR Card No. 1203		RECORD OF GEAR and PINION WEAR Card No. 1203		RECORD OF GEAR and PINION WEAR Card No. 1890	
Motor No. 1		Motor No. 2		Motor No. 1	
Axle No. 1656		Axle No. 801		Axle No. 1232	
Armature No. 272,191		Armature No. 272,269		Armature No. 343,024	
Date Gear Installed 11/12/07		Date Gear Installed 11/12/07		Date Gear Installed 7/23/08	
" Pinion " 11/12/07		" Pinion " 11/12/07		" Pinion " 7/23/08	
Gear mileage to date 1/13/09-61,045		Gear mileage to date 1/13/09-61,045		Gear mileage to date 1/11/09-24,360	
Pinion mileage to date 1/13/09-61,045		Pinion mileage to date 1/13/09-61,045		Pinion mileage to date 1/11/09-24,360	
Wear on pitch circle of gear tooth .09"		Wear on pitch circle of gear tooth .11"		Wear on pitch circle of gear tooth .05"	
Wear on pitch circle of pinion tooth .06"		Wear on pitch circle of pinion tooth .08"		Wear on pitch circle of pinion tooth .032"	
Gear purchased on Order No. 3821		Gear purchased on Order No. 3820		Gear purchased on Order No. 5922	
Pinion purchased on Order No. 3820	Pinion purchased on Order No. 3820	Pinion purchased on Order No. 17,176			
On special test	On special test	On special test			

Fig. 14—Brooklyn Rolling Stock—Specimens of Gear and Pinion Records

ment to 28.75 m.p.h. with the Westinghouse 93 equipments. The saving in power consumption on the basis of watt-hours per ton-mile is largest, with 11.39 per cent, in the Westinghouse 101 motors, and smallest, with 1.79 per cent, in the GE80 motor.

On the elevated lines all of the Westinghouse 50 E and 50 L motors are being changed from a ratio of 19:52 to one of 17:54. The 50 B motors were originally geared for 17:52, and will remain thus. The 19:64 ratio of the new commutating pole motor, however, is satisfactory for operation in the same train as the 17:54 motors. The change in the elevated motor gearing saves from 11.5 per cent to 13 per cent in power and effects a reduction of the maximum speed from 33 1/4 m.p.h. to 30 1/4 m.p.h without increasing the schedules.

The alterations in gear ratio on the surface cars are made

14.3 Pitch Involute Teeth

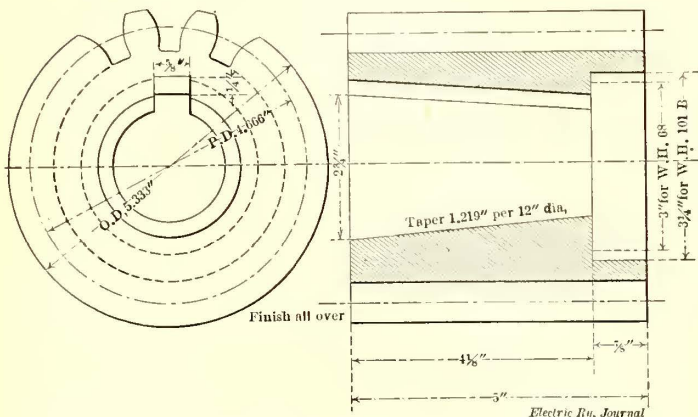


Fig. 15—Brooklyn Rolling Stock—14-Tooth Pinion for Westinghouse No. 101 and Westinghouse No. 68 Motors

on the maintenance basis; that is, coincident with the replacement of the old gearing. On the elevated cars, however, the gears are replaced whenever it is necessary to change car wheels, even if the old gearing is still serviceable. The greater proportionate saving in the case of the elevated equipments accounts for this difference in practice.

The higher gear ratios were formally adopted in Octo-

ber, 1907. By April 30, 1909, 1036 surface equipments had been altered out of a total of 2840, and 626 elevated equipments out of a total of 1052.

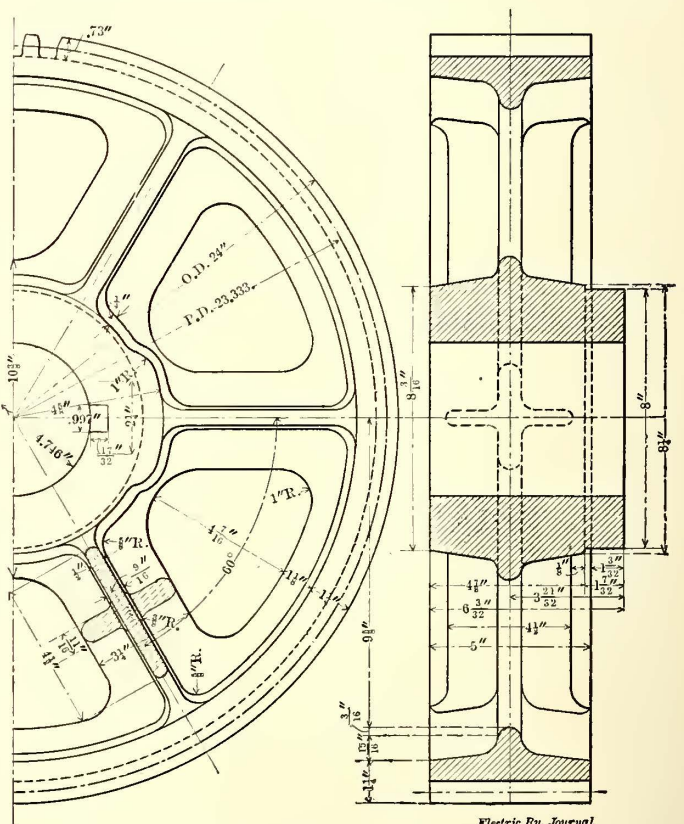


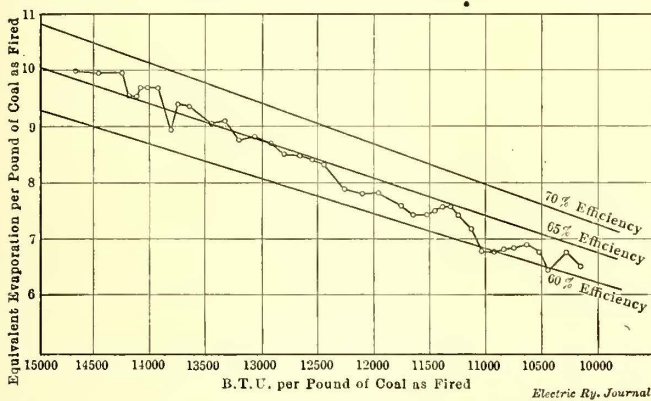
Fig. 16—Brooklyn Rolling Stock—70-Tooth Gear for GE-80A and Westinghouse 101-B Motors

illustration. They are made as follows: After the gear or pinion under test has been cleaned, an imprint is secured on a piece of thin paper hammered against the edges of the teeth. The individual profiles are then traced, but all the special lettering common to all records is kept on a separate tracing. The blue prints are therefore made from superimposed tracings, with the curves on the lower sheet.

COALS FOR HAND-FIRED STEAM PLANTS

An interesting paper on this subject was read at a meeting of the American Water Works Association at Milwaukee, last week, by D. T. Randall, engineer in charge of the fuel engineering department of the Arthur D. Little Laboratory, Boston, and recently engineer in charge of fuel tests, Technological Branch, United States Geological Survey.

Mr. Randall described the tests on different fuels made by the Technological Branch of the United States Geological Survey at St. Louis, and gave typical analyses, with the b.t.u. contained, of various coals. He stated that the size of coal is not of as much importance as is usually thought to be the case, but that the smaller sizes require more draft and are slightly less efficient. Nor does the ash affect results as much as might be expected. Owing to the fact that the moisture, ash and volatile matter usually increase together in the poorer coals, it is difficult to separate the effects of any one of them from the other.



Evaporation with Coals of Different Heating Values

He thought that with a good furnace, hand-fired, it would be possible to obtain practically the same efficiency with high volatile coals as with low volatile coals.

The accompanying diagram shows the relation between the heating value of the coal and the water evaporated in the boiler per pound of coal for about 400 tests. This diagram indicates that the evaporation is nearly in proportion to the heating value of the coals. Where this is not the case, probably either the coal did not burn completely or the method of firing, or air supply, may have been at fault. The results also are not corrected for influence of size of coal, loss of carbon in ashpit, loss of heat to evaporate moisture in coal and loss due to the use of excessive amount of air in burning the coal. Mr. Randall said that to evaporate the moisture in the coal requires about 1/2 per cent of the fuel value with good Eastern coal, about 1 1/4 per cent with Illinois coal, and about 5 per cent to 8 per cent with the lignites.

MEETING OF COMMITTEE ON POWER GENERATION

A meeting of the committee on power generation of the American Street & Interurban Railway Engineering Association was held May 11 at the Fort Pitt Hotel, Pittsburgh. There were present: G. H. Kelsay, chairman and superintendent of power, Indiana Union Traction Company; William Roberts, superintendent of motive power, Northern Ohio Traction & Light Company, and Fred Heckler, superintendent of motive power, Lake Shore Electric Railway Company.

The work allotted this committee this year was to devote

especial attention to steam meters, flue-gas analyzers and exhaust-steam turbines, thus practically following up the work of last year's committee.

The committee mapped out a line of investigation on these three subjects, differing from that of last year's plan, in that it will be a canvass not only of manufacturers, but of users of this apparatus, whether industrial companies, railways or individuals. The committee expects to have ready for sending out in a short while a data sheet covering this work.

SANITARY RECOMMENDATIONS TO RAILWAY COMPANIES

At the conference of State and provincial boards of health of North America, held at Washington, D. C., June 4 to 5, a report on railway sanitation was presented by a committee of which Dr. J. N. Hurty, secretary of the Indiana Health Board, is chairman. After congratulating the steam and electric lines upon the advances made in railway and traction line sanitation in the last few years, the following recommendations were submitted:

(1) The ventilation of stations and coaches should be more carefully attended to. While fully recognizing the limitations and peculiar problems attendant upon coach ventilation, still it is true that ventilation could be bettered. Betterment could be accomplished by the more careful and thorough instruction of trainmen in the methods of ventilation with the means at hand, and requiring by rules and orders that careful attention be given to the matter. The abating of the foul and fetid air often existing in the waiting rooms of small stations is merely a matter of opening windows and doors at proper times, and continuous ventilation of such places could be furthered by the adoption of ventilating ducts or simple window-boards.

(2) The construction and sanitation of large stations are not here criticised, but all too frequently small stations are found which are unnecessarily dirty and foul. Some of these stations should be replaced with new ones. Others should be remodeled and newly painted, and all should be supplied with decent private sanitary facilities. As soon as this is accomplished and station employees instructed in the part they are to perform, an appeal to the public to help keep the station clean will certainly meet with the approval of all good people, and the present defective conditions will be greatly bettered.

The grass plots and flower beds frequently seen at small stations are a profitable investment, and any steps toward better small station sanitation will also prove a good investment.

(3) The final adoption of coaches with plain interior construction and with absence of absorbent materials as far as may be possible will certainly be only a question of time. The cleanliness of coaches at the beginning of trips is a mere matter of cleaning as ordered by the management, but keeping the coaches clean when in use involves the co-operation of the public. To secure this aid it is recommended that train porters be supplied with cards or advertising leaflets appealing to the people to help keep the cars clean.

(4) It seems practicable that certain traveling inspectors already employed could be instructed in railway sanitation and be required to make sanitary inspections and report violations of sanitary regulations and to make suggestions.

(5) It would probably be a good investment for some railroad companies to employ a trained sanitarian to suggest and maintain sanitary conditions.

A Royal Commission has reported favorably on the construction of subway for tramcars under the harbor of Sydney, New South Wales. The estimated cost is \$2,300,000. The commission recommends that the tunnel be large enough to accommodate standard size cars.

SYSTEM OF ACCOUNTS PRESCRIBED BY WISCONSIN RAILROAD COMMISSION

Under the system of accounts prescribed by the Railroad Commission of Wisconsin for street and interurban railways three classes of companies are created and different classifications of operating expense accounts are set up for each. Three permanent reserve funds are required, covering, respectively, depreciation, sinking fund and amortization. These reserve funds are treated as deductions from gross income. The titles of the accounts, which have been received through the courtesy of W. J. Hagenah, statistician of the commission, are as follows:

Class A companies—those having gross earnings in excess of \$500,000 per year.
 Class B companies—those having gross earnings less than \$500,000, but in excess of \$80,000 per year.
 Class C companies—those having gross earnings less than \$80,000 per year.

SCHEDULE OF REVENUE ACCOUNTS.
A.—REVENUES FROM TRANSPORTATION.

CLASSES A, B AND C.

1. Passenger revenue.
2. Chartered car revenue.
3. Parlor and chair car revenue.
4. Baggage revenue.
5. Mail revenue.
6. Express revenue.
7. Milk revenue.
8. Freight revenue.
9. Switching revenue.
10. Miscellaneous transportation revenue.

B.—REVENUES FROM SOURCES OTHER THAN TRANSPORTATION.

CLASSES A, B AND C.

1. Station and car privileges.
 2. Parcel room receipts.
 3. Storage.
 4. Car service.
 5. Park and resort revenue.
 6. Telegraph and telephone service.
 7. Rent of tracks and terminals.
 8. Rent of equipment.
 9. Rent of land, buildings and other property (used in operation of railway).
 10. Sale of power.*
 11. Joint electric power revenue (profit).
 12. Miscellaneous revenues from sources other than transportation.
- *Revenues from the sale of power other than from the operation of a separate utility. If power is also generated at the power station for the conduct of another utility service a separate report by the latter excluded from railway operating expenses by means of the power accounts "Other Operations—Cr." or through the "Appointment Accounts" in the classifications prescribed for the respective utilities.

SCHEDULE OF OPERATING EXPENSE ACCOUNTS.

CLASS A.

I.—WAY AND STRUCTURES.

- Superintendence of way and structures.
- Maintenance of ballast.
- Maintenance of ties.
- Maintenance of rails.
- Maintenance of rail fastenings and joints.
- Maintenance of special work.
- Maintenance of underground construction.
- Maintenance of paving.
- Miscellaneous roadway and track expenses.
- Clearing and sanding track.
- Removal of snow, ice and sand.
- Maintenance of tunnels, bridges, trestles and culverts.
- Maintenance of elevated structures and foundations.
- Maintenance of crossings, fences, cattle guards and signs.
- Maintenance of signal and interlocking systems.
- Maintenance of telephone and telegraph systems.
- Miscellaneous way and structure expenses.
- Maintenance of poles and fixtures.
- Maintenance of underground conduits.
- Maintenance of transmission system.
- Maintenance of distribution system.
- Miscellaneous electric line expenses.
- Maintenance of buildings, fixtures and grounds.
- Other operations—Dr.
- Other operations—Cr.

CLASS A.

II.—EQUIPMENT.

- Superintendence of equipment.
- Maintenance of power plant equipment.
- Maintenance of substation, transformer station and storage battery equipment.
- Maintenance of passenger and combination cars.
- Maintenance of freight, express and mail cars.
- Maintenance of locomotives.
- Maintenance of service equipment cars.
- Maintenance of electric equipment of cars.
- Maintenance of electric equipment of locomotives.
- Maintenance of shop machinery and tools.
- Shop expenses.
- Maintenance of utility equipment.
- Miscellaneous equipment expenses.
- Other operations—Dr.
- Other operations—Cr.

III.—TRAFFIC.

- Superintendence.
- Advertising.
- Miscellaneous traffic expenses.

CLASS A.

IV.—CONDUCTING TRANSPORTATION.

- Superintendence of power.
- Wages of power plant employees.
- Wages of substation, transformer station and storage battery employees.
- Fuel for power.
- Water for power.
- Power plant lubricants.
- Miscellaneous power plant supplies and expenses.
- Substation, transformer station and storage battery supplies and expenses.
- Power purchased.
- Power exchanged—balance.
- Other operations—Dr.
- Other operations—Cr.
- Superintendence of transportation.
- Wages of passenger conductors, motormen and trainmen.
- Wages of freight and express conductors, motormen and trainmen.
- Wages of miscellaneous car service employees.
- Miscellaneous car service expenses.
- Wages of station employees.
- Wages of car-house employees.
- Miscellaneous station expenses.
- Miscellaneous car-house expenses.
- Operation of signal and interlocking systems.
- Operation of telephone and telegraph systems.
- Express and freight collections and delivery.
- Loss and damage.
- Miscellaneous transportation expenses.

CLASS A.

V.—GENERAL.

- Salaries of general officers.
- Salaries of general office clerks.
- General office rent.
- General office supplies and expenses.
- Law expenses—general.
- Miscellaneous general expenses.
- Railroad Commission expenses.

VI.—UNDISTRIBUTED.

- Injuries and damages.
- Insurance.
- Stationery and printing.
- Operation of stores department.
- Operation of utility equipment.
- Rent of tracks and terminals.
- Rent of equipment.

CLASS B.

I.—WAY AND STRUCTURES.

- Superintendence of way and structures.
- Maintenance of roadway and tracks.
- Miscellaneous maintenance of way.
- Maintenance of poles and fixtures.
- Maintenance of underground conduits.
- Maintenance of transmission system.
- Maintenance of distribution system.
- Miscellaneous electric line expenses.
- Maintenance of buildings, fixtures and grounds.
- Other operations—Dr.
- Other operations—Cr.

II.—EQUIPMENT.

- Superintendence of equipment.
- Maintenance of power plant equipment.
- Maintenance of substation, transformer station and storage battery equipment.
- Maintenance of cars and locomotives.
- Maintenance of electrical equipment of cars and locomotives.
- Miscellaneous equipment expenses.
- Other operations—Dr.
- Other operations—Cr.

III.—TRAFFIC.

CLASS B.

IV.—CONDUCTING TRANSPORTATION.

- Superintendence of power.
- Wages of power plant employees.
- Wages of substation, transformer station and storage battery employees.
- Fuel for power.
- Water for power.
- Power plant lubricants.
- Miscellaneous power plant supplies and expenses.
- Substation, transformer station and storage battery supplies and expenses.
- Power purchased.
- Power exchanged—balance.
- Other operations—Dr.
- Other operations—Cr.
- Superintendence of transportation.
- Wages of passenger conductors and trainmen.
- Wages of freight and express conductors, motormen and trainmen.
- Miscellaneous car service employees and expenses.
- Station employees and expenses.
- Car house employees and expenses.
- Operation of signal, interlocking, telephone and telegraph systems.
- Express and freight collections and delivery.
- Loss and damage.
- Miscellaneous transportation expenses.

CLASS B.

V.—GENERAL.

- Salaries of general officers.
- Salaries of general office clerks.
- General office supplies and expenses.
- Law expenses—general.
- Miscellaneous general expenses.
- Railroad Commission expenses.

VI.—UNDISTRIBUTED.

- Injuries and damages.
- Insurance.
- Stationery and printing.
- Operation of stores department.
- Operation of utility equipment.
- Rent of tracks and terminals.
- Rent of equipment.

CLASS C.

I.—WAY AND STRUCTURES.

Superintendence of way and structures.
Maintenance of way.
Maintenance of electric lines.
Maintenance of buildings, fixtures and grounds.
Other operations—Dr.
Other operations—Cr.

II.—EQUIPMENT.

Superintendence of equipment.
Maintenance of power equipment.
Maintenance of cars and locomotives.
Maintenance of electric equipment of cars and locomotives.
Miscellaneous equipment expense.
Other operations—Dr.
Other operations—Cr.

III.—TRAFFIC.

Traffic expense.

IV.—CONDUCTING TRANSFORMATION.

Power operating labor.
Fuel for power.
Water for power.
Miscellaneous power supplies and expenses.

CLASS C.

Power purchased.
Power exchanged—balance.
Other operations—Dr.
Other operations—Cr.
Superintendence of transportation.
Wages of conductors, motormen and trainmen.
Miscellaneous transportation expenses.

V.—GENERAL.

General office salaries.
Miscellaneous general expense.
Railroad Commission expense.

VI.—UNDISTRIBUTED.

Injuries and damages.
Insurance.
Stationery and printing.
Operation of stores department.
Operation of utility equipment.
Rent of tracks and terminals.
Rent of equipment.

DEPRECIATION.

CLASSES A, B AND C.

Depreciation reserve charge.

CONTINGENCIES (EXTRAORDINARY).

CLASSES A, B AND C.

Contingencies (extraordinary) reserve charge.

TAXES.

CLASSES A, B AND C.

Taxes.

DEDUCTIONS FROM GROSS INCOME.

CONTRACTUAL ACCOUNTS.

CLASSES A, B AND C.

1. Interest on funded debt.
2. Interest on real estate mortgages.
3. Interest on floating debt.
4. Contractual sinking fund requirements.

RESERVE ACCOUNTS.

REQUIRED PERMANENT RESERVES.

CLASSES A, B AND C.

1. Depreciation reserve.
2. Sinking fund reserve.
3. Amortization reserve.

OPTIONAL RESERVES.

CLASSES A, B AND C.

1. Maintenance reserve.
2. Injuries and damages reserve.
3. Insurance reserve.

SCHEDULE OF STOCK ACCOUNTS.

CLASS A.

Roadway and track material.
Electric line material.
Car equipment material.
Electrical car equipment material.
Shop supplies.
Fuel.
Power plant lubricants and supplies.
Car lubricants and supplies.
Miscellaneous material and supplies.

CLASS B AND C.

Track and electric line material.
Car material.
Fuel.
Miscellaneous material and supplies.

SCHEDULE OF CONSTRUCTION AND EQUIPMENT ACCOUNTS.

CLASSES A, B AND C.

INTANGIBLE:

1. Organization.
2. Franchises.
3. Rights, licenses, etc.

TANGIBLE:

4. Land (used in operation of property).
 - a. Right of way.
 - b. Other land used in electric railway operations.
5. Roadway:
 - a. Grading.
 - b. Ballast.
 - c. Ties.
 - d. Rails, rail fastenings and joints.
 - e. Special work.
 - f. Underground construction.
 - g. Track laying and surfacing.
 - h. Paving.
 - i. Roadway and track tools.
 - j. Tunnels.
 - k. Elevated structures and foundations.
 - l. Bridges, trestles and culverts.

m. Crossings, fences, cattle guards and signs.

n. Interlocking and other signal apparatus.

o. Telegraph and telephone lines.

6. Electric line:

- a. Poles and fixtures.
- b. Underground conduits.
- c. Transmission systems.
- d. Distribution system.

7. Buildings, fixtures and grounds (used in operation of property).

- a. Dams, canals and flumes.
- b. Power plant buildings, fixtures and grounds.
- c. Substation, transformer station and storage battery buildings, fixtures and grounds.
- d. General office buildings, fixtures and grounds.
- e. Shops and car-house buildings, fixtures and grounds.
- f. Stations, waiting rooms and miscellaneous buildings, fixtures and grounds.

g. Docks and wharves.

8. Power plant equipment:

- a. Boiler plant equipment.
- b. Steam power plant equipment.
- c. Gas power plant equipment.
- d. Hydraulic power plant equipments.
- e. Gas producer equipment.
- f. Substation, transformer station and storage battery equipment.

9. Rolling stock and equipment:

- a. Revenue cars.
- b. Locomotives.
- c. Service equipment.
- d. Electrical equipment of cars and locomotives.

10. Shop equipment.

11. Utility equipment.

12. Stores department equipment.

13. Miscellaneous equipment.

14. Miscellaneous construction and equipment expenditures:

- a. Salaries.
- b. Office supplies and expenses.
- c. Stationery and printing.
- d. Law expenses.
- e. Injuries and damages.
- f. Insurance.
- g. Taxes.
- h. Interest.
- i. Discount on bonds.
- j. Miscellaneous.

15. Cost of railway purchased (in lieu of railway constructed).

BALANCE SHEETS.

ASSETS.

CLASSES A, B AND C.

PROPERTY AND PLANT:

Cost beginning of year.
Construction and equipment current fiscal year.
Cost close of year.

TREASURY SECURITIES:

Treasury stock.
Treasury bonds.

INVESTMENTS:

Stocks and bonds of other companies.

Other investments.

RESERVE, SINKING AND SPECIAL FUND ASSETS:

Depreciation reserve fund.
Sinking fund.
Amortization reserve fund.
Special funds.

CURRENT ASSETS:

Cash.
Notes and bills receivable.
Accounts receivable.
Interest and dividends receivable.
Material and supplies.
Sundry current assets.

PREPAID ACCOUNTS:

Prepaid insurance.
Prepaid taxes.
Prepaid interest.
Sundry prepaid accounts.
Open accounts.
Deficit.

LIABILITIES.

CLASSES A, B AND C.

CAPITAL LIABILITIES:

Capital stock preferred.
Capital stock common.
Funded debt.

MORTGAGE LIABILITIES:

Real estate mortgages.
Other mortgages.

CURRENT LIABILITIES:

Notes and bills payable.
Accounts payable.
Matured interest on funded debt unpaid.
Matured interest on notes and bills payable unpaid.
Dividends unpaid.
Deposits.
Sundry current liabilities.

ACCRUED LIABILITIES:

Insurance accrued.
Taxes accrued.
Unmatured interest on funded debt accrued.
Unmatured interest on notes and bills payable accrued.
Dividends accrued.
Sundry liabilities accrued.
Open accounts.

RESERVE, SINKING AND SPECIAL LIABILITIES:

Depreciation reserve.
Sinking fund.
Amortization reserve.
Special funds.
Surplus.

Of a total number of 5746 rail failures reported by steam roads to the New York Public Service Commission, Second District, 3917 are for the period from Dec. 1, 1907, to April 1, 1908, and 1829 for the four months ended March 31, 1909.

NATIONAL ELECTRIC LIGHT ASSOCIATION CONVENTION

The 32d annual convention of the National Electric Light Association was held at Atlantic City June 1-4. The meeting was characterized by a large attendance and a very interesting program of papers and committee reports. While most of the papers related to commercial and special problems of central station management a number were devoted to broader aspects of electrical engineering. These are of equal interest to the managers and engineers of electric railway properties and are briefly abstracted below:

CONDENSER AND COOLING-TOWER DESIGN AND OPERATION

M. R. Bump in treating certain important points in the design and operation of condensers and cooling towers shows that the cost of pumping the circulating water depends directly upon the amount of heat imparted to each pound of water in the condenser. For a minimum pumping cost, the water should leave the condenser exactly at the temperature of the steam entering the condenser. In the surface type of condenser it is necessary to allow for a certain difference of temperature between the steam and the water because of the metallic tubes and the amount of heat transferred is directly proportional to the differential temperature allowed. As the amount of surface is increased the cost will increase in definite proportion, while the differential temperature required will decrease. This permits of a reduction in the quantity of water to be pumped and therefore reduces both the size and first cost of the pumps and also the power required to operate them. With the jet condenser it should be possible to reduce the differential temperature to a few degrees, although it is more common to find the difference greater than in the surface condenser. The greatest inherent advantage of the jet condenser is wasted by operating it with the discharge water at a temperature below 90 deg. when it should be at least 105 deg. There are many considerations which affect the selection of the type of condenser to be used. Dirty and scaly water call for a jet condenser, but if the scale is not thrown down in the condenser a surface condenser may be used to advantage if the water can be returned to the boilers and care is exercised not to have it pure distilled, which is believed to attack the iron in the boilers with avidity. It is often possible to effect a very material saving in cost and size of condensers by allowing for a reduced vacuum when the temperature of the water is high. It is then a problem of balancing the added cost of fuel, etc., against fixed and operating charges on the condenser equipment to determine the most economical installation.

With reciprocating engines the gain in economy by the last 1 in. or 2 in. of vacuum is relatively very much smaller than it is on the steam turbine, and the introduction of low-pressure turbines has emphasized the importance of high vacua, which are essential to their successful operation. The daily and annual load factor on the unit also have an important bearing on the condenser. Where the load fluctuates and is considerably below rated output, the question must be looked at in a different light. The important items outside the pump itself are, first, to keep the piping system from the point where the pressure goes below atmosphere to and including the condenser and its auxiliaries, as nearly bottle tight as possible, and, second, to cool the air entering the pump and remove from it as much of the water vapor as possible. In the jet condenser particular attention should be given to the air offtake, which should be so designed that all the air must pass in intimate contact with the cold water entering the condenser chamber. In the surface condenser, proper attention should be given to the distribution of the baffle plates in order to accomplish this result as nearly as possible. In many cases the air should be drawn off through a separate chamber in which it is cooled to a temperature almost that of the entering water. This would enable a considerable reduction to be made in the size of the air pump and in the work the pump does. The surface condenser is used almost exclusively on all large turbine installations and has given better results than jet condensers ordinarily show. There seems to be no inherent advantage, however, that would justify any appreciable difference between the two types of condensers. The selection of the pump-driven unit for

any condensing installation must depend upon other plant conditions. If the exhaust is needed for feed-water heating steam driven pumps are the most desirable. Otherwise the selection depends on a comparison of first cost and operating expenses of motor and steam-driven pumps.

Cooling towers may be divided into two types, those using natural draft and those using forced draft for circulating the air. A comparison of the two types involves a study of climatic conditions, ground space, cost per unit of surface as compared with the cost of a circulating fan and other factors. Localities possessing a dry climate are best suited for using cooling towers. Various materials have been used for the wetted surface of cooling towers. Rough board, wood blocks, tile and galvanized wire screens have been tried, but the most satisfactory material is burlap curtains. Some of these curtains are now four years old.

Cooling ponds with jets scattered through the pond and discharging into the air over the water have been used to some extent. The amount of power required for pumping is very large and the first cost excessive. The majority of cooling towers installed in the United States are of the forced draft type, but European practice seems to be toward natural draft towers.

PERFORMANCE SPECIFICATIONS AND RATING

W. L. Waters, of the Westinghouse Electric & Manufacturing Company, in a paper entitled "Performance Specifications and Rating," made several recommendations having in view an improvement in the present very unsatisfactory condition surrounding the rating of generators and motors. After criticizing the present system of temperature guarantees, the author expresses the opinion that the most rational method of temperature rating is to specify the maximum continuous rating at which a unit can be safely operated with a certain room temperature—25 deg. C., for example; and where desirable, a safe two-hour or three-hour overload, with the same room temperature, can also be given. This reduces the system to a single guarantee of the maximum safe load which a unit will carry continuously with a specified room temperature; and this maximum load will be the greater the lower the temperature of the air which cools the machines. Referring to the influence of the power factor on the rating of a machine, any method giving alternators a different rating for every operating power factor would probably be too complicated for practical work. A method, however, is quoted in the paper whereby all machines shall be given a nominal rating in kilo-volt-amperes at 100 per cent power factor, and in addition the maximum load given which they will carry at various lower operating power factors. The maximum load at low power factors is decided for some machines by holding up the voltage, and for others by the heating of the field coils. In the latter case this maximum load should be referred to a definite room temperature—25 deg. C., for example. This method gives for the purpose of comparison a nominal rating at 100 per cent power factor, and in addition gives the purchaser exact information as to the operative characteristics of the proposed unit under any particular condition of load.

As to rotary converters and synchronous motors, the power factor with these should be kept strictly at 100 per cent, unless for some special reason definitely specified and understood at the time a machine is purchased. If synchronous motors are used to correct the power factor of a line, the maximum kilovolt-amperes at the required power factor should be specified, exactly as in the case of the alternating-current generator. A synchronous motor designed to operate at 100 per cent power factor is just as unsuitable for operating at a low power factor as an alternator would be in a similar case.

Testing to determine if a unit meets specified detailed performance guarantees is always a very difficult question. Unless the test is made in the laboratory the input-output efficiency test of, say, a motor-generator cannot be made with greater accuracy than 2 per cent or 3 per cent, and it is almost impossible to get an accurate direct test of the voltage regulation of an alternator. In both these cases the direct method of test has to be abandoned in favor of an indirect method, which will give more accurate results. Temperature tests are extremely difficult to carry out ac-

curately, and unless careful precautions are taken by experienced observers it is often impossible to be sure of results to 5 deg. It is concluded that in general a customer will do better to spend his time in investigating the conditions of operation and specifying a machine suitable for these conditions than to make tests to determine regulation and temperature rise. By means of suitable performance specifications, which can be definitely checked in operation, a customer can hold the manufacturer.

LOW-PRESSURE STEAM TURBINES

C. H. Smoot, in a paper with the above title, sets forth arguments in favor of the use of low-pressure turbines of the Rateau-Smoot type. This type is described in detail, and the advantages claimed for it are brought out by comparison with other types of similar turbines. The author states that it has now been thoroughly established that the most efficient steam engine is a compound unit, consisting of a reciprocating engine acting between boiler pressure and approximately atmospheric pressure and exhausting into a low-pressure turbine, which in turn discharges into a condenser. While it is still a mooted question whether the greater cost of a combined engine and low-pressure turbine plant over that of a turbine plant alone will compensate for the increased economy, there is no doubt that existing plants equipped with reciprocating engines will show an improved economy if run non-condensing in connection with a low-pressure turbine equipment. In conclusion the author strongly recommends that owners of non-condensing plants should consider the opportunity of utilizing the exhaust steam of reciprocating engines in low-pressure steam turbines.

GAS ENGINE REPORT

The committee reports considerable progress in the gas producer and states that there are now on the market producers that can gasify successfully fuels which cannot be burned economically under boilers. Referring to the operation of the modern gas engine, it is stated that its reliability cannot be questioned at this time, and that the committee has evidence of many plants, some of which were visited by its members, that have been operating over long periods without being shut down—even a month without intermission. Regulation has been so perfected by improved designs and methods of governing that all reliable makers to-day will undertake contracts for installing gas engines of either the two-cycle or four-cycle type to operate in parallel alternating current generators of 25 cycles or 60 cycles; and the committee adds that no member need hesitate to contract with any of these concerns on the score of reliability and regulation, as just as reliable results may be obtained as with the ordinary type of steam engine. As to the operation of gas producers, the personal equation enters largely and poor results are frequently the result of careless operation. Instructions for operation should be followed carefully, and a man of intelligence placed in charge of a producer installation. The report gives descriptions in greater or less detail of about a dozen plants visited, several of which supply current for railways.

The cost of these plants, including buildings, foundations and cost of erection, varied from \$133 to \$167 per maximum kilowatt capacity, the average figure being \$152; the maximum capacity being about 20 per cent above the normal rating. The cost of the building varied from \$16 to \$44 per kilowatt, with an average of \$33; of producer equipments, including piping, from \$33 to \$49 per kilowatt, with an average of \$38; of the gas engine, from \$38 to \$55, with an average of \$47; foundations, \$5 per kilowatt; generators, \$12 to \$15, and switchboards, \$3 per kilowatt. The maximum capacity of the plants ranged from 360 kw to 2790 kw, with an average of 1200 kw. Tests of short duration indicated a coal consumption as low as 1 lb. per hp-hour, which figure, it is stated, can be also obtained from units as low as 100 hp or even less.

SOME RECENT DEVELOPMENTS IN ELECTRICAL APPARATUS

E. W. Allen, of the General Electric Company, who is the author of the paper with the above caption, describes a 14,000-kw, vertical-shaft turbo-alternator, the novelty of which is the high speed of rotation which has resulted in the production of a generator of small diameter, large output per pound of materials and smaller radiating surface,

but without commensurate decrease in cost. In order to conduct the heat away the generator is enclosed except at the intake and discharge openings. When the machine is running the revolving field acts as a powerful fan, and while the scheme is applicable to large generators, it does not apply to all sizes. Direct-current generators for high-speed work now have their commutator bars held in place by steel rings shrunk over the outer circumference of the commutator, thus affording great mechanical strength and ready insulation of the bars due to their plane shape. The difficulties encountered in the high frequency of commutation have been overcome by the adoption of auxiliary commutating poles. Full advantage is taken in the design, of the benefits to be derived from the use of commutating poles and particular attention has been given to the ventilation and to assisting the movements of air through the field and commutator coils by means of a fan mounted at the end of the shaft opposite the commutator. In the converting apparatus the author describes the regulating-pole, synchronous converter and its operation. Vertical-shaft synchronous converters rated at 2500 kw are being built for locations where space is limited. No change has been made in the general design of frequency changers except that vertical-shaft construction is used here also. A 6666-kilovolt-amp, 0.75 power-factor, 25-cycle to 60-cycle set is now being built for the Commonwealth Edison Company, which in point of output will be the largest yet built. The author notes the improvement made in the methods of circulating the oil in transformers, and by this means providing a more efficient means of conducting the heat from the seat of its generation. The aluminum-cell lightning arrester has increased in reliability on high-voltage transmission lines and may be termed one of the most important developments that has taken place in the design of protecting apparatus. The author records the commercial status and success which have attended its operation and which have caused the manufacturer to adopt and recommend it as a standard device for all classes of high-tension transmission lines.

DEPRECIATION ACCOUNTING FOR SMALL COMPANIES

George W. Caffin, United Electric Securities Company, in his paper on this subject, gave the following as the maintenance and depreciation charges of a small company in five years:

	Total maintenance, percentage of gross.	Additional allowance, percentage of gross.	Total depreciation, percentage of gross.
1904	8.10	8.45	16.55
1905	9.35	8.15	17.50
1906	10.90	6.89	17.79
1907	9.56	6.84	16.40
1908	10.01	7.10	17.10

A larger company adopted a system of charging a fixed monthly sum for depreciation in addition to the regular maintenance expenditures, similar to that followed by the small company. This sum has been increased during the period, and is to-day more than three times the amount originally charged. The total depreciation for the various years is a somewhat larger percentage of gross than was the case with the small company.

The two companies mentioned have preferred to use the replacement value of their properties as a basis for their depreciation allowance, and have each continued to make the monthly charge a fixed amount in addition to the maintenance expenditures.

Five or six years is perhaps too short a period in which to form definite conclusions, but the experience with these two properties seems to show that, in addition to regular maintenance expenditures, an annual allowance of 3 per cent of replacement value in the case of this small company, and of 5 per cent in the case of the large company, would properly provide for the depreciation of tangible property.

ELECTRICAL SECURITIES

Frank A. Vanderlip, president of the National City Bank of New York, in an address on this subject outlined the following conditions as necessary to make an electrical security attractive to the general investing public:

The company should earn at least twice its interest charges over operating expenses, maintenance and depreciation. The depreciation fund should be in some equivalent of cash.

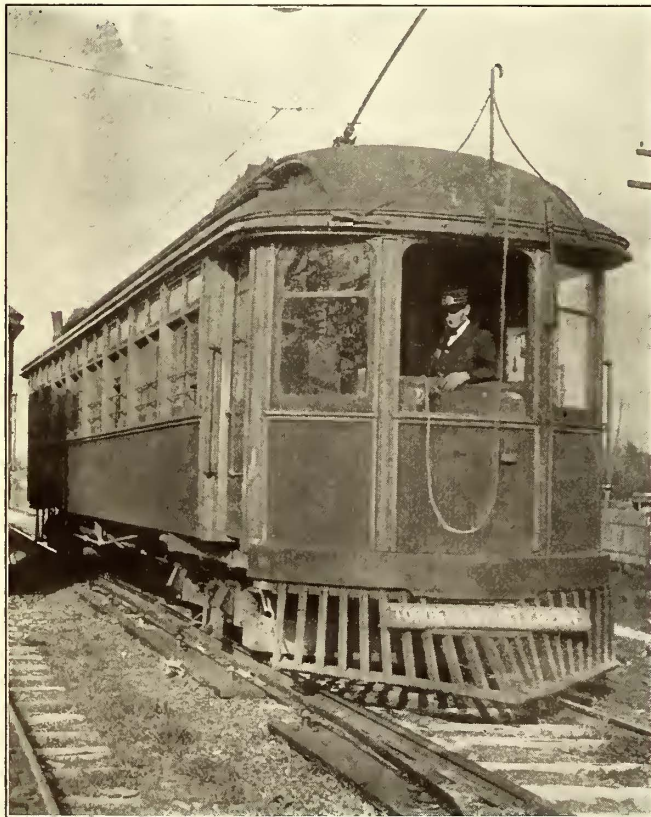
It should serve a population of 50,000 or over. The securities should, in the main, net the investor 5 per cent.

Expenditures that should go under operating expenses should not be charged to renewals. The careful bond buyer will analyze accounts rigidly to ascertain that the temptation to do this has been resisted.

If the plant is modern, with reasonable rates, and if the conditions mentioned are met, a security will be created that will be in many ways attractive. If, in addition, the security is large enough to secure marketability, a bond will result that will compare favorably with any other returning a similar rate of interest.

THE SIGNAL AND DISPATCHING SYSTEM ON THE MIMICO DIVISION OF THE TORONTO & YORK RADIAL RAILWAY

The Toronto & York Radial Railway has been using for several months on its Mimico Division, extending 10 miles west of Toronto, a signal and dispatching system installed by the Simmen Automatic Railway Signal Company, of Los Angeles, Cal., and Toronto, Ont. This is the first installation of this system on an electric interurban railway, but it has already been in regular service for over a year on an 18-mile Southern California division of the Santa Fé Railroad, as described in the *ELECTRIC RAILWAY JOURNAL* of July 4, 1908. The Mimico Division is probably one of the busiest single-track lines in existence, as the schedule provides for a 20-minute service during certain hours and requires about 2500 daily signal indications. The importance of accurate signaling and dispatching on such a



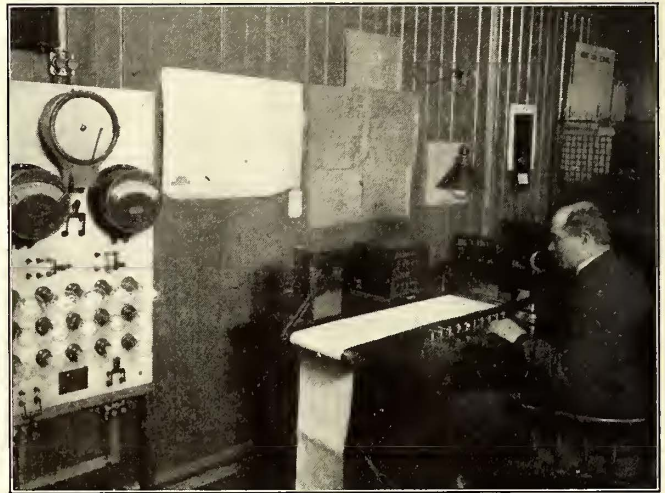
Toronto Interurban Dispatching—View of Car Equipped with Shoe for Signal Current Rail Alongside

line is self-evident. Through the adoption of the Simmen method the dispatcher is not only enabled to issue orders to the motormen over car telephones as given points are passed, but is also provided with a recording mechanism which shows him at all times the speed and location of

every car in service. Further than this, interlocking arrangements on his switchboard make it impossible for him to order one car to proceed through a certain block until the block has been cleared by the car previously given the right of way.

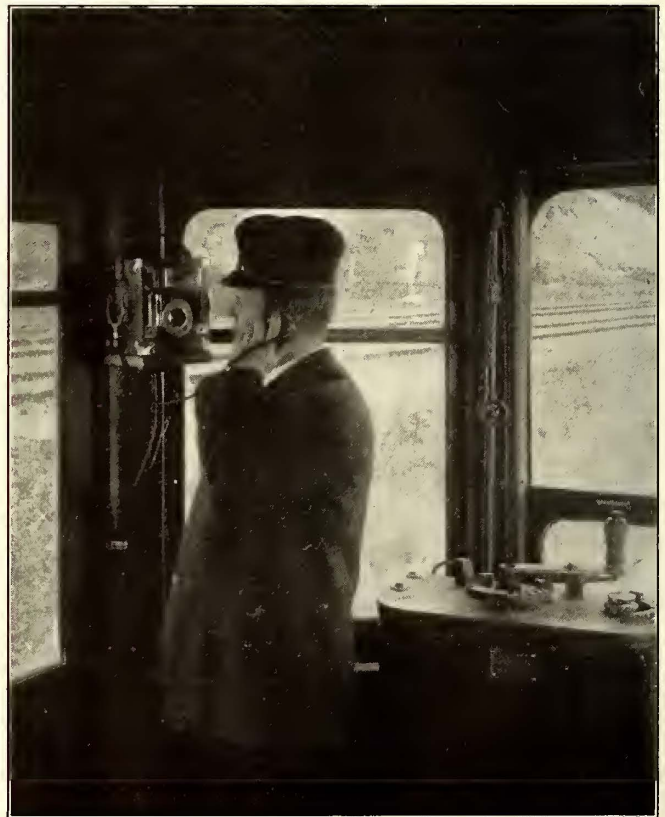
DETAILS OF APPARATUS

The train movement record sheet in the dispatcher's of-



Toronto Interurban Dispatching—Dispatcher's Office, Showing Record Sheet

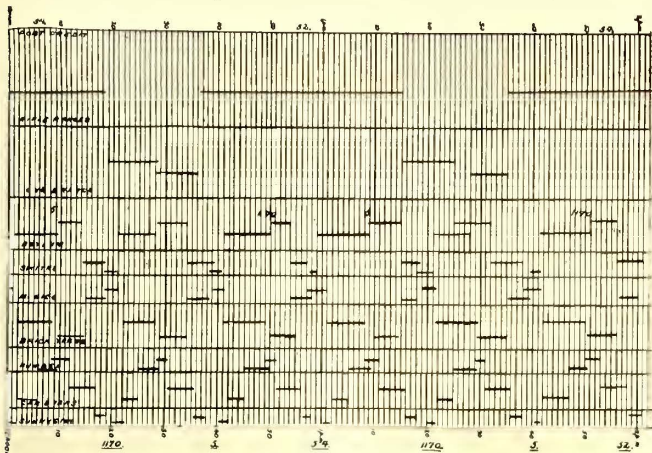
ice consists of a chart divided into time lines in one direction and block lines in the other. The record of



Toronto Interurban Dispatching—Motorman Receiving Orders by Telephone

train movements is made by needles operated by clock work, each block having its own perforating needle. Thus, as a car enters the first block the corresponding needle proceeds to mark the sheet. When the car enters the next block the corresponding needle is set in operation while

the first one stops. Consequently the dispatcher is provided with an automatic and undisputed record of the car movements throughout the section under his care. It will be noted that some of the lines on the record-sheet overlap, thereby making it appear as if two trains were running in the block at the same time. This is not the case, however, as this is only the local circuit in the office, which is



Toronto Interurban Dispatching—Record of all Train Movements

controlled by the dispatcher. The overlap is explained by the fact that when the first motorman reports at the siding, his time ceases at that switch and appears in the next block until the opposing motorman meets him. It will be noted in one case where two cars meet at Long Branch that the eastbound car reported three minutes ahead of the westbound car, thus causing between Long Branch and Asylum switch an overlap of three minutes. This shows the time that the eastbound car had to wait at the siding for the westbound car. Other overlaps may be explained in like manner.

The instruments which make the station records receive current through auxiliary home and distant third-rails at the ends of every block on the line. It will be noted from the wiring diagram that a separate signal wire runs from the dispatcher's office to these third-rails, which are simply strap-iron contacts 40 ft. long. Connection to the car signal circuit is obtained through contact shoes carried on the trucks. The balance of the original car signal equipment comprises a relay, a red lamp, a green lamp, a storage battery, an alarm bell and a telephone. This equipment is

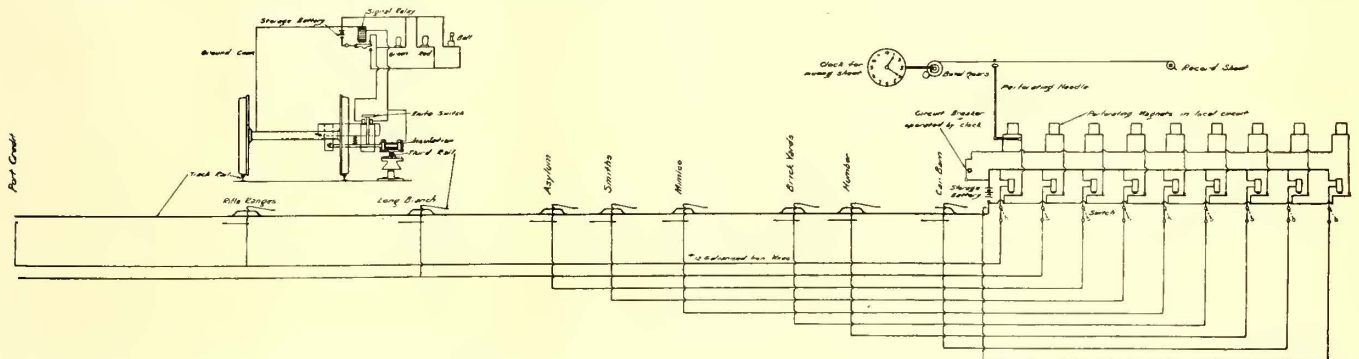
from a storage battery in the dispatcher's office through the individual line wire, contact shoe, signal circuit in the car to the wheels of the truck, thence through the track rails and a relay in the dispatcher's office to the opposite side of the battery. As the closing of this circuit energizes the dispatcher's main relay, the latter in turn closes the local circuit which actuates the perforating needle corresponding to the block. A continuous record line is obtained by polarized relays as long as the car is in any one block. A circuit-breaker in the local office circuit, operated by a make-and-break relay, vibrates the marking magnet to prevent friction on the record sheet.

The car signal main circuit passes through a relay and a knife switch. The relay controls two auxiliary circuits in which the signal lamps are located. As the knife switch is closed when the contact shoe is not on the third-rail, the relay is energized by current from the car battery on the car and gives a clear signal. As soon as the contact shoe touches a third-rail the knife switch opens and the car battery circuit has no further influence on the relay. If the third-rail is energized from the battery in the dispatcher's office the clear signal is retained, but should the dispatcher open the circuit in his office the car relay would be deprived of all energy. This will cause current from the car battery to light up the danger lamp and ring an alarm bell until the motorman calls the dispatcher for instructions. The telephonic communication between the cars and the dispatcher is established by the use of condensers.

FEATURES OF THE SYSTEM

These prominent visual and aural indications make it out of the question for a motorman to ignore the dispatcher's summons. The signals are given, no matter at what speed the car is running. Since the danger signal is inevitable unless the third-rails are energized by the dispatcher, the system may be defined as one having a normally closed "danger" circuit. The main car circuit passes through the front or top contact of the car relay, so that when the danger signal has been given and the relay energized the only possible way to clear the signal is by having the dispatcher close the switch in his office at West Toronto.

In general, the function of this system is to provide unmistakable dispatching instructions through the senses of hearing, sight and speech. If it were found desirable, the system could be also combined with automatic stops and



Toronto Interurban Dispatching—Wiring Connections of Dispatching Apparatus on the Mimico Division, Showing the Locations of the Contact Rails at Sidings

being simplified by combining the bell, telephone and lamps in one portable box, which can be carried from one end of the car to the other according to the position of the motorman.

As the car passes a third-rail a circuit is established

semaphores. An important feature from the maintenance standpoint is that practically all of the apparatus, except the special recording mechanism in the dispatcher's office, is made of standard parts which can be purchased in the open market.

HINTS TO CONDUCTORS AND MOTORMEN OF THE MILWAUKEE SYSTEM

"Hints to Conductors and Motormen" of the Milwaukee Electric Railway & Light Company are distributed weekly. The practice of circulating good and helpful advice on small "hint cards" was started by George Kuemmerlein,

Jr., superintendent of transportation of the company, on July 5, 1908, and as it was found to be successful, it has been continued regularly. When Mr. Kuemmerlein first started the issue of the cards it was his idea that he would be able to get a little closer to the trainmen by giving them in plain language information as to the wishes of the company and at the same time avoiding the necessity of issuing

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 1—JULY 5, 1908

Here are the Standard Phrases:

**USE THEM
DON'T BE TIMID**

Their use will make your work easier

Fares, Please
Step Quickly, Please
Let Them Off, Please
Enter Car Front Way, Please
Move Toward Center of Car, Please

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 2—JULY 12, 1908

COLLECT HALF FARES

If each Conductor misses
10 Half Fares per Day
at 30c each
30c per Day per Conductor
30 Days
\$9.00 per Month per Conductor
12 Months
\$108 per Year per Conductor
500 Conductors

\$54,000 LOSS PER YEAR!

These figures are startling.
Greater Diligence Must Be Exercised
or severe measures will be resorted to.

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 3—JULY 19, 1908

Be Polite and Courteous.

Be Patient with Passengers—
make Ride Safe and Pleasant

Be on look out for Passengers
—Stop for them.

Be Watchful at Transfer Inter-
sections.

**Never Start Car Until All
Are On Safely**

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 4—JULY 26, 1908

**KEEP YOURSELF
NEAT AND CLEAN**

**KEEP YOUR CAR
CLEAN AND TIDY**

**KEEP SHADES UP
AFTER SUN SET**

**KEEP NEWSBOYS
OFF CAR**

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 5—AUG 2, 1908

Always secure address of in-
jured party in case of accident.
If they are strangers in city,
always secure city address at
which they are stopping.

Always direct passengers to
vacant seats in car, and do not
allow employes in uniform to
occupy seats when others stand.

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 6—AUG 9, 1908

Don't talk to motorman.

**Don't ride upon front plat-
form; Watch rear end.**

**Don't talk to passengers
and neglect your duty.**

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 13—OCT. 4, 1908

Pay special attention to the venti-
lation of your car.

Don't talk to motorman. You
cannot watch rear end and avoid
accidents while in front end of car.
Your place is upon rear end, and we
must insist that you remain there
when not collecting fares.

Caution passengers not to leave a
moving car, and never start a car
while passengers are leaving same.

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 19 NOV. 15, 1908

Fares, Please
Step Quickly, Please
Let Them Off, Please
Enter Car Front Way, Please
Move Toward Center of Car, Please

Standard phrases shown above *MUST* be
used. Their use will assist you in the col-
lection of all the fares upon your car, facil-
itate the movement of passengers, and make
your work easier in many other ways. A
good conductor will use the above phrases
without being urged to, and any conductor
who is found unwilling to use his voice and
these phrases will be removed from the
service.

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 21—NOV. 29, 1908

Many conductors are in the habit
of giving "go ahead" signal upon
answer to motorman's foot gong
that all is clear upon rear platform
without themselves looking to see
whether all passengers have alighted
or boarded. Conductor must never
give "go ahead" signal unless he
looks to rear, and also unless he
knows that everybody is clear of
rear step.
Help us to avoid accidents.

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 24—DEC. 20, 1908

Conductors should always in-
sist that passageway be kept
clear on rear platform, thus al-
lowing passengers to freely
board and alight from car.

Conductors must always be
firm in asking passengers to
step to one side in order to clear
passageway; but in doing so be
polite and courteous.

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 25—DEC. 27, 1908

Many women passengers are alight-
ing from moving car and falling
while conductor is inside either fig-
uring his trip sheet or filling out his
envelope. This usually occurs near
end of line. Conductors must be upon
rear platform while passengers are
leaving cars, especially when car is
not crowded and they are not en-
gaged in the collection of fares. Wo-
men should always be cautioned not
to leave a moving car, and if they
insist upon jumping off they should
be restrained by conductor putting
arm across platform.

T. M. E. R. & L. Co.

HINTS TO CONDUCTORS
No. 31—FEB. 7, 1909

Conductors are becoming lax in
allowing passengers to leave moving
cars. This is especially true of wo-
men passengers. Conductors should
insist that women stay upon car un-
til it has come to a dead stop, as
most of them jump off backwards
and fall. If women insist upon jump-
ing off moving car, conductor should
put his arm across platform prevent-
ing them from doing so.

stringent orders which would have to be obeyed under penalty of discipline. It was thought that if appeals were made to the men in this manner advantageous results would be obtained.

In the accompanying illustrations 12 of the cards issued to motormen and an equal number of those distributed

among the conductors are shown. Some of the cards that have been issued are entitled "Hints to Trainmen," and in these cases the distribution was made to both conductors and motormen. The cards that were used for both classes of trainmen related to subjects in which they were equally interested.

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 1—JULY 5, 1908

Ring Your Gong Loud
and often, approaching every crossing and vehicle.

Be Careful
when approaching children playing upon street. They have no judgment

USE YOURS

**Accidents Cost Money
Help Us Reduce Them**

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 2—JULY 12, 1908

DO NOT WASTE POWER
It costs money.

DRIFT CAR DOWN HILL
It will go fast enough.

DO NOT ABUSE YOUR CAR
Electrical machinery is delicate.

HANDLE IT CAREFULLY

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 3—JULY 19, 1908

DON'T
Run Car Wild and Reckless.
Run Fast Over Special Work.
Start Car Until Receiving Bell from Conductor.
Start Car While Passengers Board Front End.
Start Car While It Is Loaded Without Looking to See that Rear Step is Clear.

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 4—JULY 26, 1908

DON'T Start Car Over Railroad Xing or Onto Draw Bridge Until Receiving "Come Ahead" Signal from Conductor.

DON'T Pass Stationary Car at Street Intersections at High Speed. Always Sound Gong Loudly to Warn Persons and Vehicles that You Are Approaching.

DON'T Run Around Curves at High Speed.

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 5—AUG 2, 1908

Do Not Talk To Passengers

Announce Number Passengers Boarding Front Way

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 6—AUG 9, 1908

Always run car to red marker upon span wire at down town intersections.

Don't change doors before reaching extreme end of line.

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 13—OCT. 4, 1908

Don't talk to passengers. You cannot operate your car properly and talk to passengers at same time. Ring your gong—not once—but many times. Don't run your car beyond your control. Car should always be under your control, and this will avoid striking vehicles, persons, or cars ahead of you or at an intersection.

Your motto should be
"AVOID ACCIDENTS."

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 14—OCT. 11 1908

Motorman must test fender on both ends of car before pulling out of station. He must also see that fender arms and split keys are in proper place.

Brakes and controller should be tested before pulling car out of station.

See that your sand box is in condition, as it may prevent an accident. Before pulling car out of station be sure you have your tool box. Also a good supply of witness cards, that you may assist your conductor in case of accident.

T. M. E. R. & L. Co.

HINTS TO MOTORMEN.
No. 19 NOV. 15, 1908

Too many fares are being missed account motormen not ringing conductor and announcing in a plain and distinct tone of voice how many passengers boarded front end of car, and as to their location on the platform or inside of car. If necessary, point out passengers to conductor.

It is the duty of every motorman to assist conductors in the collection of fares, and any motorman who fails to do this or, shows an unwillingness to co-operate will be considered unfit for the service.

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No 30 JAN 31, 1909

Don't start car until receiving two clear and distinct bells from conductor.

Don't pass stationary car at street intersections at high speed. Always sound gong loudly to warn persons and vehicles of your approach.

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 32—FEB. 14, 1909

During this season of the year, when snow and ice impede traffic to a more or less extent, motormen could assist greatly in keeping the lines in operation by the use of the scrapers upon the car. Many times cars are stalled simply because motormen do not drop the scrapers and push the snow and ice to one side. The use of the scrapers will also prepare a much better rail for your car and thus make the progress of the car easier, with less work on your part. If the scrapers upon your car fail to work, report it for the good of the service.

T. M. E. R. & L. Co.

HINTS TO MOTORMEN
No. 35—APRIL, 18, 1909

Police officers stationed at the downtown intersections frequently complain that Motormen block crossings and when spoken to become insolent. It must be understood that police officers have authority in the movement of vehicles and pedestrians at the downtown intersections and when a signal is given by a police officer it must be obeyed.

We want it distinctly understood that we desire harmony and co-operation between this company and the Police Department and every effort should be made to avoid friction.

More attention must also be paid to company's representatives who are at the intersections during rush hours. Some motormen do not watch for signal and as a result traffic is blocked while the man in the middle of the street is trying to get motorman's attention in order to flag him over.

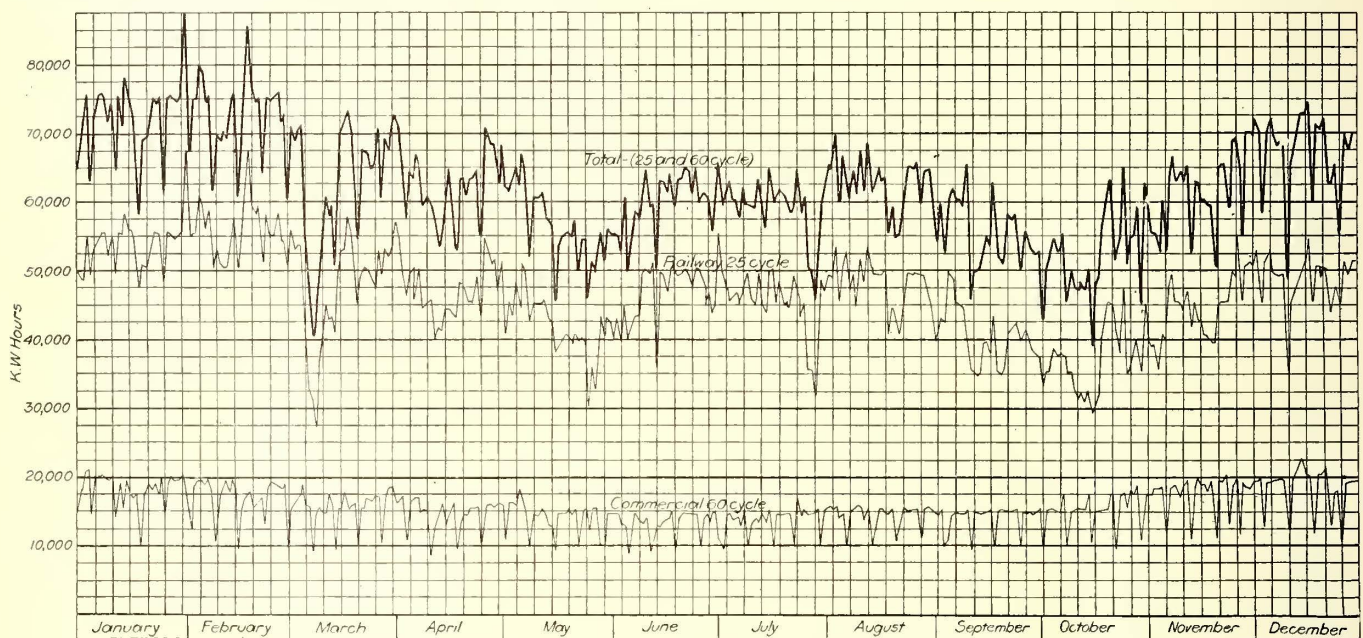
OPERATING FEATURES OF THE SPY RUN POWER HOUSE*

BY M. J. KEHOE, SUPERINTENDENT OF POWER, FORT WAYNE
& WABASH VALLEY TRACTION COMPANY

The first power house of the Fort Wayne & Wabash Valley Traction Company, was located on Chestnut Street, Fort Wayne. It contained three 200-kw, and one 500-kw, direct current generators, belt-driven by simple non-condensing, heavy-duty type engines. This plant was built in the business district, where property values are high. As the floor space was large, due to the belted connections, the fixed cost was extremely high. The boiler room was very small, with practically no coal storage, owing to the fact that when this station was built an apparent abundance of natural gas was to be had. It was only a short time, however, until this source of cheap fuel supply was exhausted. At the time gas was used for fuel, the plant showed excellent results, producing a kilowatt at a very low operating cost, but when coal was substituted for fuel, this cost was increased 50 per cent. Later the Fort Wayne & Wabash Valley acquired the Wabash River Traction Company, which had a power station located at Boyd Park, containing somewhat more modern equipment,

vacuum was carried on the engines which were designed with the proper cylinder ratio for 26.5 in. of vacuum. Steps were immediately taken to partially rectify this trouble by increasing the load factor. This was done by placing rotaries at Logansport and doing away with the Logansport power station. The Fort Wayne city lines were also cut in with the substations on the southwestern line, and by running the Huntington and Boyd Park engines in parallel, the peaks and the cost per kilowatt hour were reduced.

It soon became apparent, however, that it would be necessary to operate heavier and larger cars at a higher rate of speed, which would increase the output of the power stations to such an extent that the cost of power would be excessive. It was then decided to erect a modern central station, to enable the cost of power to be reduced to the minimum. A site was selected on Spy Run Avenue, Fort Wayne, on the St. Joe River, on account of the quality and quantity of water procurable for condensing and other purposes, and the good railway and switching facilities. On this site was erected, during the summer of 1906, a modern double-deck power station with an ultimate generating capacity of 8500 kw. Like many other railway companies, the Fort Wayne & Wabash Valley



Yearly Load Diagram of Spy Run Power House

consisting of one 500-kw, a. c. generator, direct-connected to a cross-compound condensing engine, and two Allis, simple condensing engines, belt-connected to two 250 kw, d. c. generators. This plant was located on the Wabash River, where ample water was available for condensing purposes and had a siding on the Wabash Railway with ample coal storage room. It would appear that it would be possible to have a comparatively low cost per kw-hour, at this plant, but after operating it for several months, it was found that the cost per kw-hour was higher than at the Chestnut Street plant with its non-condensing belted equipment. This was accounted for by the load factor, which consisted of very high peak loads in proportion to the output, and required to be carried in service at all times the greatest part of the equipment of the plant to take care of the peaks, whereas, at Fort Wayne, the load was very even throughout the day, with the exception of a morning and evening peak load.

At Huntington, where the company had a still more modern plant, the conditions were found to be still worse than at Boyd Park. The Huntington plant consisted of two direct-connected, cross-compound, condensing units of more modern design than those at either Chestnut Street or Boyd Park. This high operating cost was also due to the small output and the large peaks, and also because no

Traction Company, having adopted the policy of developing light and power business in connection with its traction system, and having purchased the property of the Fort Wayne Light & Power Company, decided to serve both traction and lighting systems from this central power station.

The principal features of this Spy Run station may be summarized as follows:

1. A two-story, rectangular brick structure with side wings for the accommodation of auxiliary apparatus, coal bunker, machine shop and stores.
2. Generating machinery on second floor above the boilers.
3. Structural foundations with concrete floor construction.
4. Independent twin barometric jet condensers, of the Buckley type.
5. Gravity conduit system for cooling water.
6. Independent, direct-driven exciters with common bus for each system.
7. Simple, short and direct steam pipes, with continuous upward slope from boiler nozzle to turbine throttle.
8. Sufficient superheater surface to maintain dryness or moderate superheat at beginning of expansion in the turbines.
9. Roney mechanical stokers with gravity fuel feed
10. Coal storage, served by a gantry coal crane.

*Abstract of a paper read before the Central Electric Railway Association, Ft. Wayne, Ind., June 3, 1909.

11. Steam-driven auxiliaries for feed heating.
12. Fireproof transformer compartments, with transformers mounted on rolling trucks to facilitate removal.
13. System of ventilation for turbo-generators.
14. Remote control oil circuit-breakers with time limit overload relay.
15. Tirril regulation on each generator.
16. Automatic damper regulators controlling dampers and stoker engines, and automatic feed water regulators.

The use of structural steel foundations for the turbines, in the writer's opinion, is not entirely justifiable. It was thought they would be free from vibration on account of the absence of reciprocating motion of unbalanced parts, but more or less disagreeable vibration has been noted, with no apparent bad effects, however. Concrete foundations built up from the ground should be used.

K.W. output	SPY RUN POWER STATION LOAD.		Total
	Railway.	Commercial.	
Maximum per day.....	16,984,642	5,698,029	22,682,671
Average per day.....	68,661	22,660	87,841
Average demand factor.....	46.406	15.568	61.974
Maximum demand factor.....	56.8%	18.5%	37.3%
Average load factor.....	84.1%	28.1%	53.0%
	66.3%	65.9%	70.3%

This could be done by a slight change of design, and extending certain portions of the side walls of the boilers on up to the engine-room floor.

The arrangement of boilers and turbines permits of the simplest form of piping, involving but two bends. An equalizing header running the length of the boilers, complicates the piping only to the extent of extra valves and pipe hangers. A direct path is provided from the steam header to the turbines. Every turbine has the advantage of being located directly over its own battery of boilers, and connected with them through this header. In the normal running of the plant, an effort is made to keep those boilers in service nearest the turbines in operation, thus giving the minimum distance of steam flow. When occasion arises, the plant may be operated on the unit system, valves being supplied for this purpose in the header between the various risers. Superheated steam is provided direct from the main to all the principal auxiliaries in the plant. This avoids an auxiliary steam main.

Mechanical stoking was adopted, not only to minimize labor costs, but also to provide ample forcing capacity for peak loads and emergencies. With Hocking Valley screenings three men can handle without difficulty, 10 boilers, or 1330 boiler-hp each. Hand firing for the same capacity would require 10 firemen and two water-tenders, or 400 boiler-hp per fireman, a reduction of 60 per cent.

The condenser plant consists of barometric jet twin condensers of the Buckley type, mounted near the level of the turbine exhaust. The tail pipe extends down to the normal river level and steam-driven reciprocating pumps are installed to overcome the excessive barometric head. These pumps are somewhat of a novelty, being 16 in. and 36 in. by 48 in. with wooden pistons to insure lightness. They have to handle a great amount of sediment and large quantities of water, as is the case with all barometric condensers. This type of condenser has proved very satisfactory, particularly with the double-deck layout, the condenser being suspended beneath the turbine where its bulky part is out of the way; its tail pipe drops down behind the boilers.

Normally about 150 tons of coal are burned per day. For coal storage, an elevated bunker of 400-tons capacity fulfils all requirements for gravity feed, and will tide the plant over a period of about 2½ days in case of failure of the coal handling apparatus. The main coal storage yard will hold about 6000 tons of coal, which is sufficient for 1½ months' supply, although normally only about 4500 tons are held in storage, except in case of impending fuel shortage, when the storage yard is filled to its utmost capacity. The gantry crane serving this storage yard combines the function of unloader, crusher, elevator and distributor. Its normal capacity is about 50 tons per hour, but the operator has unloaded a 40-ton car in 20 minutes, and a maximum of 11 40-ton cars in a short working day. The crane is electrically operated, and is controlled by one man.

The two sections of the generating plant, 25-cycle and

60-cycle, are, as stated previously, separated electrically, and therefore each is controlled by a separate switchboard. Two additional boards control the rotary converter output for both 25-cycle and 60-cycle systems, the latter consisting of d. c. power circuit for elevators and other power. A fifth board controls the exciters.

With perhaps the exception of the exciters, the generating plant is standard throughout. In place of the usual steam-driven exciter, with motor-driven duplicate, each generating unit is provided with its own direct-connected exciter, all generating at 125 volts. Each exciter has sufficient capacity to carry two generators, and all may be connected to a common bus, as an emergency condition. Normally, the 25-cycle and 60-cycle exciters are separate, to permit the use of independent Tirril regulators.

All the generators draw their supply of ventilating air from a sheet-steel duct running the length of the building above and in front of the boilers. During the summer months, a positive pressure fan which has been installed is used to accelerate the air flow during certain prevailing winds, and during extreme hot weather. This system of forced generator ventilation maintains a low generator temperature the year around and makes possible greater generator overloads.

At the Spy Run station, the engineer in charge of the turbine takes care of all speed adjustments by manipulating the individual governors. Each turbine has its own oil pump, cooler and strainer reservoir, all of which apparatus is readily accessible from the engine-room floor. When desired, the oil may be entirely drained out of any of the turbines into the filter below and a fresh supply of oil can be pumped into the machine.

OPERATION

Some difficulties were experienced in starting this plant. A great deal of trouble was caused by the 25-cycle generators breaking down. The vibration was very severe and blades were constantly rubbing out and the spindles bending. The cause of this was that the alignment was not properly taken care of by making allowances for contraction and expansion. The armature slots were not smooth enough, and the coils had a tendency to keep step with the cycles. It was necessary to smooth these slots up and

FUEL CONSUMPTION OF SPY RUN POWER STATION.

	Tons.
Coal on hand Jan. 1, 1908.....	4,500
Received during year 1908.....	50,995.40
	55,495.40
Coal on hand Jan. 1, 1909.....	2,000
Total coal used.....	53,495.40
Coal actually consumed.....	47,633,609
Shrinkage, due to transportation and storage.....	5,771,791
Total	53,495.40
	Lb.
Coal consumed per K.W.H.....	4.2
Shrinkage per K.W.H.....	.508 +
Total coal per K.W.H.....	4.708 +

wedge the coils in each slot very tightly, to keep them from burning out. The spindles had to be lined up at the normal temperature of operation. At the time, the vacuum maintained was very low, which caused a high temperature at the end of the bearings. This together with the generator fields being out of balance, caused considerable trouble and interruptions of service. After determining and removing the cause of the trouble, for the past two years, there has been no further difficulty.

The ease with which the turbo-generators take overloads of 75 per cent is remarkable, and the only fear of breakdown which is entertained is for the breakers and switches. The Tirril regulators maintain the voltage on the railway circuits very closely.

The efficiency of the plant as a whole is very good. The following data are of interest:

The maximum boiler horse power in service is 0.8 horse power per kilowatt generated. This is very low, taking into consideration the peaks which have to be taken care of. Very often peak loads of 6000 kw have to be handled. The output of the plant during the year 1908 was 22,682,671 kw hours, the maximum daily output being 87,841 kw hours and the average daily output being

61,974 kw hours. Other features are the reasonably high vacuum maintained at such a low investment cost; the length and construction of the transmission line, which is 114 miles long and carries 33,000-volt current with 6 ft. triangular spacing non-transposed wires; a heavy load carried at the extreme end of the line, and a power factor of practically unity.

JUNE MEETING OF THE CENTRAL ELECTRIC RAILWAY ASSOCIATION

The last spring meeting of the Central Electric Railway Association was held at Fort Wayne, Ind., on June 3. There were 124 railway and supply men present. Several manufacturers exhibited supplies in the parlors of the Anthony Hotel, where the meeting was held. A. A. Anderson, general manager, Indianapolis, Columbus & Southern Traction Company, president of the association, was in the chair.

Secretary A. L. Neereamer read the minutes of the previous meeting. S. D. Hutchins, chairman of the committee to consider methods for filing matters in periodicals, stated that at a meeting of the committee held in Indianapolis it had been found that there was considerable merit in the scheme proposed at the Cleveland meeting by R. N. Hemming, but as there were other methods perhaps equally as good, the committee asked for more time to consider the question fully.

On motion, 26 supply men were elected to associate membership.

A paper on piece work in electric railway shops was read by J. A. Gohen, representing the Cleanola Company. An abstract of this paper was printed in the *ELECTRIC RAILWAY JOURNAL* of June 5, page 1042. C. B. Fairchild, Jr., read some observations on piece work in electric railway shops, with particular reference to the practice of the Interborough Rapid Transit Company, New York.

C. E. Sawtelle, Tool Steel Gear & Pinion Company, Cincinnati, Ohio, said that this company was putting its employees on the piece work basis, and also was planning to make small blocks of company stock available for those employees who desired thus to invest their earnings. It was believed that these two innovations would increase the loyalty and efficiency of the men. Mr. Sawtelle knew of objections to the piece work system, but thought that the benefits far outweighed the defects.

President Anderson asked if any company represented at the meeting had installed the piece work system, but the replies were all in the negative.

George H. Whysall, Columbus, Delaware & Marion, had been investigating the results to be obtained by the piece work system, and had not thought it advisable to install this system for a road of moderate size unless an arrangement could be made whereby all or part of the men would work on hourly wages for part of a day and piece work for the remainder of the time.

H. A. Nicholl, Indiana Union Traction Company, also had considered the piece work system for his company, but had reached no definite conclusions.

E. C. Spring, Dayton, Covington & Piqua Traction Company, called attention to the experience of a large number of manufacturing plants in the city of Dayton, Ohio, with the piece work system. In these factories it had been shown that the results were most satisfactory where the work consisted of building assembled machines. In electric railway shops it might be found difficult to put the men on the piece work basis on account of the diversity

of the operations. If, however, as suggested, the carpentry, armature and cleaning departments were put on the basis of piece work half a day and half a day regular time the results might be satisfactory and an improvement over present conditions.

T. W. Shelton, Indianapolis, Columbus & Southern Traction Company, did not favor piece work in a small shop. There the men must be called upon to do all classes of work and must be shifted hurriedly from one job to another. If the piece work system was installed in such a small shop a desire would be created for the men to do that work at which they could earn the most money, and dissatisfaction might result.

George H. Whysall said that the shop accounts of his road showed not only on what part of a car a man had worked, but the time taken for each operation, and with the present accounting system so subdivided he did not think it would be a very great task to install the piece work system. The employees then could state on "time slips" just how many operations they had performed, rather than how long they had worked on one car.

C. D. Paxton, Dayton & Troy Railway, thought that strict adherence to the piece work system in a small shop would interfere with the flexibility of the work.

Mr. Gohen, the author of the paper, in closing the discussion held that piece work would benefit any shop. The principle underlying the piece work system was that the men were made co-partners with the employer; they learned to be more independent, and low costs and harmony resulted.

The report of the committee on charges for handling equipment will be presented at the next meeting.

The secretary read a report on recommendations of the executive committee regarding the exchange of transportation between member companies.

At the opening of the afternoon session W. B. Wright, auditor, Indianapolis & Cincinnati Traction Company, read a paper on "The Auditing Department," which was printed in abstract in the *ELECTRIC RAILWAY JOURNAL* of June 5, page 1040.

M. J. Kehoe, superintendent of power, Fort Wayne & Wabash Valley Traction Company, next read a paper describing the interesting constructional features of the Spy Run power station of that company. This paper will be found on pages 1084 and 1085.

When questioned, Mr. Kehoe said that, roughly, the dividing line in the choice of units for railway stations could be put at 500 kw. For larger units he would favor turbines, and for smaller capacities he would choose reciprocating engines. However, the load factor and the condensing conditions had much to do with the choice in any particular situation.

George H. Whysall said he had held the opinion that the turbine, providing ample condensing water was available, was preferable, irrespective of size, largely on account of the high efficiency of these machines at widely varying loads.

T. W. Shelton, Indianapolis, Columbus & Southern, had had little experience with turbines, but thought that the reciprocating engine was more economical for small railway plants. The turbine, to operate efficiently, required a 28-in. vacuum. This necessitated relatively large condensing and pumping machinery, which at low loads was a drain on the plant.

Mr. Kehoe had under his charge both large and small units. Among the small units was one of 400-kw capacity

that used about 30 lbs. of steam per hp-hour. In contrast with this, the larger turbine units described as part of the Spy Run power plant used but 22 lbs. of steam per hp-hour.

Mr. Whysall stated that a 1000-kw turbine in his plant when first installed would run 40 minutes from an initial speed of 750 r.p.m. after steam and load were cut off. Now that the turbine has been used for some time, it would run for 65 minutes after cutting off steam. He thought that the choice between small turbine units and reciprocating engine units depended wholly on local conditions and a selection could not be made without knowledge of these.

Under the program heading of "New Things for the Benefit of Our Members," C. D. Emmons, general manager, Fort Wayne & Wabash Valley Traction Company, described the "Rymco" automatic trolley switch as installed at 12 switches on his road. This device is a trolley switch with its movable point mechanically connected for operation in unison with the track switch point. This device does away with the necessity for a second wire in advance of the switch point and the consequent changing of the trolley and loss of power while the conductor is changing the trolley wheel from the main wire to the siding lead. The results with this device, Mr. Emmons stated, had been very successful.

T. W. Shelton described a mandrel of varying diameter which he had effectively used in compressing babbitt metal in armature bearings. After a bearing had been rebabbitted and bored to within $1/32$ in. of the finished diameter, the mandrel was pushed through with a wheel press. The passage of the mandrel through the bearing compressed the babbitt firmly against the shell, and this compacting resulted in a longer life to the bearing because the metal was made more dense. It also gave the bearing a very smooth surface.

E. Benjamin spoke of bearings on the Pacific Electric Railway filled with babbitt made by the Great Western Smelting & Refining Company that had run 143,000 miles and worn but 0.01 in.

Ross Taylor drew attention to the need for better ventilated cars, and told of the ventilation tests which have been carried on by the Chicago Board of Health (see *ELECTRIC RAILWAY JOURNAL* of May 8, page 876). Mr. Taylor described the device of the Automatic Ventilator Company, which, he stated, fully meets the requirements of proper ventilation. Fresh air is fed under the electric heaters at the floor level of the car and is withdrawn through exhaust ventilators placed at a number of points in the roof.

Arthur W. Brady, president, Indiana Union Traction Company, spoke of the work of the American Street & Interurban Railway Association, and urged those present to become active or associate members in this and affiliated bodies.

E. C. Spring, general superintendent, Dayton, Covington & Piqua Traction Company, was elected to honorary membership in the association on the occasion of his taking up work outside of the limits of active membership, as announced elsewhere in this issue. Several members spoke in appreciation of the work which Mr. Spring had done for the Central Electric Railway Association. The president requested all who could to travel in special cars to the next meeting, which will be held at Detroit, Aug. 26. Special cars were run to the Fort Wayne convention by the Toledo, Port Clinton & Lakeside, Indianapolis & Cincinnati Traction Company and the Indianapolis & Louisville Traction Company.

PHILADELPHIA STRIKE ENDED

The strike of the surface motormen and conductors of the Philadelphia Rapid Transit Company came to an unexpected end on June 5 through the mediation of Senator McNichol, leader of the Philadelphia Republicans. His offer to act as an intermediary was taken under consideration by both sides on Tuesday, June 2, and two days later a compromise acceptable to the company and to the great majority of the men was reached. The strike lasted exactly one week.

The agreement was signed by President John B. Parsons for the company and a representative from each depot for the men. The text follows herewith:

AGREEMENT BETWEEN COMPANY AND MEN

Made and entered into by and between the accredited representatives of the Philadelphia Rapid Transit Company, party of the first part, and the authorized committee of its employees, party of the second part.

Witnesseth, That in the operation of the lines of the company, including the elevated and the subway, that upon the signing of this agreement every employee who is now on strike shall immediately be restored to his former position in the company's service, without prejudice.

Section I. The company agrees, through its accredited representatives, to meet with the accredited representatives of its employees to adjust any differences or grievances which may arise.

Section II. The company shall advertise for proposals from reputable firms (not less than five in number) for furnishing uniforms in accordance with the specifications of the company, the employees to purchase uniforms from any firm (not less than five in number) to whom contracts for the same may be awarded. At least one firm supplying union-made uniforms shall be considered as being one of the firms to which employees may go to purchase the same.

Section III. The company agrees that when an employee is suspended or discharged and after an investigation it is found that he has been unjustly suspended or discharged, he shall be reinstated to his former position, and shall be paid for all time lost.

The wage schedule shall be 22 cents per hour for surface men and the same proportionate increase for the elevated men from June 5, 1909, to June 30, 1910, and shall become effective upon the signing of this agreement, provided that the report of the audit by the City Controller, for 1908, which shall be submitted to the company and to the committee, shall sustain the company's statement that the company's receipts do not warrant any further increase beyond 22 cents. Should the reports indicate that a higher rate can be paid, the wage scale shall be immediately adjusted in accordance therewith.

Section IV. This agreement shall be in full force and effect, beginning on the 5th day of June, 1909, and shall continue to be binding upon both parties hereto until and including the 30th day of June, 1910.

It will be noted from Section I that the company agrees to deal with committees of employees. The company issued a statement that there was a vast difference in dealing with a committee of representatives from each barn elected by a majority of the men and a committee representing a union. In the former case it would be dealing on a basis of friendliness and with the desire for mutual good understanding; in the other case it would be dealing with a committee of antagonists. The company also announced, after a directors' meeting on June 7, that it would distribute \$25,000 to reward the men who remained loyal throughout the strike.

Section II, relating to uniforms, is a modification of the original rule. Instead of buying their suits from one clothier the men will have the choice of five firms whose prices and grades conform to the railway company's specifications. In Section III it is agreed that unjustly suspended employees should be reinstated with payment for lost time. The demand for 25 cents an hour was given up, the men agreeing to accept 22 cents an hour, an increase from 21 cents. This increase had previously been

made voluntarily by the directors, but was to begin July 1, the opening of the fiscal year, instead of June 5. The employees of the elevated subway division, some of whom had joined the surface men, are to receive a proportionate increase. The basis for any increase greater than that in the agreement is to be the audit of the railway company's books as made by the City Comptroller.

Another feature of the agreement is the stipulation for the immediate employment of all the strikers. The contract is to hold from June 5, 1909, to June 30, 1910.

The Philadelphia Rapid Transit Company made the following public announcement, on June 7, to define its attitude on problems involved in the recent strike:

PHILADELPHIA RAPID TRANSIT COMPANY'S STATEMENT

In the heat of such a struggle as that which ended Saturday it is impossible to see some features of the contest in their true perspective. It is important, however, that the public should be correctly advised as to the fundamental character of the struggle and the manner in which it is viewed by the management of the company. It has been made to appear that the company was not thoroughly prepared for and was surprised by the strike order issued in the early morning hours of May 29. So far from being unprepared, the management of the company was fully advised as to every step taken by the instigators of the strike, and early in the evening of May 28 every possible means had been taken to prepare for handling any situation that might arise as a consequence of the anticipated strike order. The results of this preparedness were evident in the large number of cars operated throughout the strike. It is a matter of record that no traction company under the same circumstances has given a service so nearly approaching normal conditions. From the first day of the strike to the period when negotiations were opened for its settlement, the company operated a constantly increasing number of cars. On Thursday, when the strike was at its height, 716 cars were on the street at 9 o'clock in the morning, and the company carried in excess of 300,000 passengers. This was accomplished in spite of the fact that service was practically discontinued after 9 o'clock in the evening, partly to relieve the strain upon the loyal men and partly to avoid as far as possible opportunity for rioting.

It is likewise extremely important to bear in mind that the strike was not brought about by any generally expressed desire on the part of the majority of the company's men. Prior to the calling of the strike two committees had called upon officers of the company to present demands for increased wages and changes in working conditions. These committees were not received for the reason that they had no other origin, credentials, or authority than were derived directly from a union comprising perhaps one-sixth of the company's employees. The company did not then and does not now recognize any obligation to deal with such an organization. It has always consented to receive complaints and communications of all kinds from its employees. The position of the company with respect to dealings with the union is believed to be thoroughly justified in this case by the fact that such dissatisfaction as existed among its men was the sole work of a single agitator specially employed for this purpose. Had the dissatisfaction of the men been general, spontaneous or justified by their working conditions, the situation would have been materially different. The fact that this was not the condition which faced the company cannot be too strongly emphasized.

Whether or not the responsibility for violence is traced directly to the promoters of the strike, it is evident that they profited largely by the rioting and intimidation with which the struggle was marked. Intimidation, in fact, was carried to extreme lengths; delegations of strikers visited the homes of loyal men, frightening the wives and children of the men at work; tradesmen throughout the city were warned not to supply provisions to the families of men who remained on the cars. The fact that so many men obeyed the strike order is not more remarkable than the number of men who remained loyal in view of the methods of intimidation employed as well as the effect upon the entire personnel of an artificially promoted agitation, which left to the majority who did not want to strike the choice between loyalty to the company and loyalty to friends and fellow-workers. The relations between the men on the cars and their immediate superiors, the barn superintendents, are close and friendly. These superintendents have received daily assurances from hundreds of men on strike that they were out against their will and greatly regretted the position into which they had been forced by the strike order.

Under all circumstances the duty of a public service corporation is to give the best service possible. This duty remains during a strike, and because of this the company felt obligated to bring 600 men from outside points to take the places of the strikers. The employment of professional "strike-breakers" was avoided and the best men obtainable were employed. As usual under such circumstances, men who had given up positions resented the employment of others to take their places, but it is believed that no justification is required of the company's policy in this respect. When on Thursday, June 3, intimations reached the company that persons connected neither with the strikers nor the company were taking steps to bring about a settlement, the management had the situation fully in hand and was beyond all doubt in a position daily to increase its service. It had every reason to believe that complete service would be restored within a few days. Nevertheless, it met these overtures in a friendly spirit and placed no obstacles in the way of an agreement honorable to both sides. In the settlement itself, few, if any, concessions were made that could not have been obtained by the employees without a strike, which cost the company, the employees and the general public hundreds of thousands of dollars. The wage increase of a cent an hour had already been granted, effective July 1; this increase was made effective 25 days earlier. It is provided in the agreement that 10 hours of work shall be completed within 12 consecutive hours, "as far as possible," and that the swing system shall be reduced to the minimum. This involves no change in the company's policy, and if entire frankness had characterized the statements of the union officials they would have conceded that with respect to hours street car employees in Philadelphia work under much more favorable conditions than prevail in other large cities.

The arrangement by which there is to be a standing committee representative of the company's employees as a whole, will, it is hoped, result in a better understanding on both sides. If, as we believe will be the case, this committee meets the management in a spirit of co-operation and good-will it will make impossible a repetition of such an unnecessary and unjustifiable strike as ended on Saturday. The agreement of June 5 is not, as has been reported, signed by the president and secretary of the union. It is signed, for the party of the first part, by the Philadelphia Rapid Transit Company, and for the party of the second part by 10 barn representatives.

MEETING OF THE CITY RULES COMMITTEE

A meeting was held, on June 7 and 8, of the Committee on Rules of the American Street & Interurban Railway Transportation & Traffic Association. The committee met at the headquarters of the association, 29 West Thirty-ninth Street, New York. There were present: R. E. Danforth, general manager of the Public Service Railway Company, Newark, N. J., chairman; L. H. Palmer, assistant to the manager, Metropolitan Street Railway Company, New York; D. A. Hegarty, general manager, Little Rock Railway & Electric Company, Little Rock, Ark., and George F. Reed, superintendent of transportation, Springfield Street Railway Company, Springfield, Mass. C. Loomis Allen, president American Street & Interurban Railway Transportation & Traffic Association, was also in attendance. Two members of the committee, H. H. Hunt, district manager Stone & Webster Managers' Organization, and Duncan McDonald, general manager, Montreal Street Railway Company, were unable to be present. The committee had met previously, and the present meeting was held to consider the suggestions which had been received since that time. It was decided very thoroughly to revise the standard code of rules in which no radical change has been made since the report of the 1906 committee.

A tentative set of rules was adopted and are printed below. The addition to the rules are printed in italics.

Where any portion of the old rules has been omitted, it is enclosed in brackets.

As will be seen, the committee decided to rearrange and re-group the rules which are now divided into three classes, each with a number of subdivisions as follows:

1. General rules
 - a. Knowledge of rules.
 - b. Responsibility.
 - c. Personal conduct.
 - d. Operative rules
 - e. Handling passengers.
 - f. Accidents.
 - g. Ejectments.
 - h. Car-house rules.
 - i. Hearing by superintendent.
2. Rules for conductors.
 - a. Operating rules.
 - b. Handling passengers.
 - c. Handling fares and transfers.
3. Rules for motormen.
 - a. Handling cars.
 - b. In regard to vehicles.
 - c. In regard to pedestrians.
 - d. Miscellaneous.

In the discussion, the question of special rules for pay-as-you-enter cars was considered, but the committee decided not to take up this subject this year. It was also decided to join in a conference with the committee on interurban rules upon the subject of bell signals so as to make the bell signals uniform on both the interurban and city roads. It will be remembered that the committee on interurban rules tentatively transposed the meaning of the two-bell and five-bell signals from the motorman to the conductor. There seem to be objections, however, to the use in city service of five bells as a danger signal and the old signal of two bells for danger was tentatively retained. As will be noticed, rule 22 has been entirely omitted.

A: KNOWLEDGE OF THE RULES

1. Knowledge of Rules: Conductors and motormen are required to be familiar with the rules, and with every special order issued. The bulletin board must be examined daily for special orders. Employment by the Company binds the employee to comply with the rules and regulations, and ignorance thereof will not be accepted as an excuse for negligence or omission of duty. If in doubt as to the exact meaning of any rule or special order, application must be made to the proper authority for information and instruction.

In addition to these rules, special orders will be issued from time to time; such orders, when issued by proper authority, whether in conflict with these rules or not, must be obeyed while in force.

B: RESPONSIBILITY

2. [6.] Responsibility: The motorman is in charge of the car and is held responsible

- (1) For the safe running of the car.
- (2) For the proper operation of the car and its machinery.
- (3) For running car according to schedule.

The conductor is in charge of the passengers on the car and is held responsible

- (1) For the safety and convenience of the passengers.
- (2) For the collection and proper accounting of fares.

Conductors and motormen will be held jointly responsible for any misconduct or negligence which either fails properly to report.

C: PERSONAL CONDUCT

3. Personal Appearance: Conductors and motormen must report for duty clothed in full regulation uniform, and must be clean and neat in appearance.

4. Politeness: Conductors and motormen must treat all passengers with politeness, avoid difficulty, and exercise patience, forbearance and self-control under all conditions. They must not make threatening gestures or use loud, uncivil, indecent or profane language, even under the greatest provocation. *Badge number of conductor and motorman must be given on request of a passenger at any time.*

5. Habits and Personal Conduct: The following acts are prohibited:

- 5 a. Drinking intoxicating liquors of any kind while on duty.
- 5 b. Entering any place where the same is sold as a beverage while in uniform or while on duty, except in case of necessity.
- 5 c. Constant frequenting of drinking places.
- 5 d. Carrying intoxicating drinks about the person while on duty.
- 5 e. Carrying intoxicating drinks on the Company's premises at any time.

- 5 f. Indulging to excess in intoxicating liquors at any time.
- 5 g. Gambling in any form, including the laying of bets (and playing raffles) while upon the premises of the Company.
- 5 h. Smoking tobacco while on duty.
- 5 i. Smoking tobacco while off duty in any part of the Company's buildings, except in the conductors' or motormen's room.
- 5 j. Reading books or newspapers while on duty.
6. [7.] Talking to Motorman: Motormen while operating cars are permitted to answer questions of superior officers, and to give proper instructions to students only. All other conversation with motormen while car is in motion is forbidden.

D: OPERATING RULES

7. [15.] Run on Time: Cars must never be run ahead of schedule time, but must pass time points and leave terminals promptly on time, unless unavoidably delayed. *Should a motorman be unavoidably detained he must not attempt to make it up by reckless running.*

Conductors and motormen must carry reliable watches which must show correct time and be compared daily with the standard station clock.

8. [30.] Starting: Motorman must never move car (whether stopped on signal or for any other reason) without signal from conductor, and then only when assured that no one is getting on or off front platform.

Conductor must never give signal to start when passengers are getting on or off.

Conductor must not put his hand on bell cord until passengers have boarded or left car; bell cord must not be touched until it is time to signal motorman to go ahead.

Conductor must never give signal to back a car unless he is on rear platform and knows track is clear behind the car.

9. [27.] Starting Cars After Blockade: In the event of a blockade of cars from any cause, the cars in such blockade must not all be started at one time, but singly, and at such intervals as will not burden the feeder line.

10. [28.] Bell Signals: From conductor to motorman, to be given on motorman's signal bell:

1 bell—"Stop at next crossing or station."

2 bells—"Go ahead."

3 bells—"Stop immediately."

4 bells—given when car is standing—"Back car slowly."

From motorman to conductor, to be given on conductor's signal bell:

1 bell—"Come [ahead] forward."

2 bells—"Watch the trolley" and danger signal to the conductor.

3 bells—"Set rear brake."

4 bells—Signal to conductor that motorman desires to back the car.

5 bells—Warning—"Pull trolley down to roof."

Whenever a car in service is stopped, for any cause except to take on or let off passengers, the motorman will, as soon as he is ready to go forward, give two taps of the gong; after which, if the conductor is ready to proceed, he will give the "Go ahead" signal.

The motorman will answer the signal to stop from conductor by one loud tap of gong; and two loud taps of gong after receiving the signal to go ahead. If unable to proceed immediately upon receipt of signal, motorman will wait for another "Go ahead" signal before starting the car.

When the car is standing, and motorman desires to back, for any reason, he will give the conductor four bells, but must not move the car until the conductor has answered with four bells to signify "All is clear behind." *However, when it is necessary to back for any distance, or whenever any danger would be likely to result from backing, motorman must always change ends.*

When two or more cars are coupled together, "go ahead" signal must first be given by conductor of rear car and be repeated by each conductor in succession on his signal bell, when he is ready to start.

11. [29.] Signals Before Passing Obstructions Near Track: Before passing any vehicle or obstruction close to the track, where passengers or conductor are liable to be injured while standing on the step of an open car, motorman must give two taps [of] on conductor's signal bell as a warning, and must bring his car to a full stop before passing vehicle or obstruction unless he has received GO AHEAD signal from the conductor indicating that all is clear. Great care must be exercised in passing over all excavations, warning workmen of the approach of car by repeatedly sounding gong, car to be under full control. Where excavations are near regular stopping place, car should be run clear thereof before stopped.

12. [31.] Danger Signals: Red lights or flags indicate danger, and when placed on the track, cars must come to a full stop until such signal is removed.

13. [18.] Reporting Defects: Conductors and motormen will report to superintendent, inspector, starter or foreman any defect in car, track or wire, which needs immediate attention and fill out blank provided for that purpose.

14. [19.] Disabled Cars: The motorman or conductor of

any disabled car, withdrawn from the main track, must remain with the car until relieved by proper authority. *When a disabled car is being pushed or pulled, the signal for starting must first be given by conductor on rear car and repeated by conductor on forward car, each conductor being careful not to give the signal when passengers are boarding or leaving car.*

15. [32.] Leaving Car: When necessary for conductor to leave his car he must notify the motorman to protect passengers and car. Should passengers board car during absence of conductor, motorman will notify conductor of the number and location of such passengers upon his return.

Cars in commission must not be left unprotected; either conductor or motorman always remaining in charge.

16. [33.] Responsibility for Damages: Employees will be held responsible for any damages caused by their neglect or carelessness or by disobedience of rules.

17. [34.] Transfer Point Meetings: Motormen and conductors will be held equally responsible for leaving a transfer point so quickly as to prevent the transfer of passengers from an approaching car on a connecting line.

18. [16.] Steam Railroad Crossings: Car must be brought to a full stop at a safe distance, approaching steam railroad crossings at grade, and motorman must not proceed until conductor has gone ahead to the center of crossing, looked both ways, and given the COME AHEAD signal. Before starting, the motorman will look back to see that no passengers are getting on or off; and in no case proceed, even after conductor's signal, until he has also examined the crossing and satisfied himself that steam cars are not approaching.

When there is more than one track the conductor must remain in advance of the car until the last track is reached.

After boarding car, conductor will give GO AHEAD signal to notify motorman that he is aboard. Motorman is forbidden to proceed without this signal.

Where crossing is protected by derail, interlocking plant, or flagman (employed by the Company) this rule does not apply, special instructions being issued to govern in such cases.

E: HANDLING PASSENGERS

19. [8.] Safety: The safety of passengers is the first consideration. All employees are required to exercise constant care to prevent injury to persons or property, and in all cases of doubt take the safe side.

20. [9.] Warning to Passengers: Conductors and motormen must, in a polite way, endeavor to keep people from jumping on or off cars while in motion. If persons attempt to get on or off the car while it is moving, they should be notified politely to wait until the car stops. If the passengers are leaving while another car is approaching from the opposite direction, they should be courteously warned to look out for the car on the other track. *Conductors must give the danger signal (three bells) if an accident appears imminent.*

21. [10.] Standing on Steps: *Permit no person to stand [Endeavor to prevent anyone from standing] on the steps or buffers. Passengers should be fully inside of the car or safely landed on the platform before the signal is given to start.*

22. [11.] Stealing Rides: Any person caught stealing a ride on a car must never be pushed therefrom while it is in motion, *but car must be stopped at next street and such person put off.*

F: ACCIDENTS

23. [20.] Render Assistance: In case of accident, however slight, to persons or property, in connection with or near any car, the motorman and conductor in charge of the same will render all assistance necessary and practicable. In no case will they leave injured persons without first having seen that they are cared for.

24. [21.] Medical Attendance: Motormen and conductors are directed not to employ medical attendance to injured persons, except for the first visit, in cases of personal injury; nor will they visit such persons at any other time afterward, unless specially instructed so to do by an officer of the Company.

[22.] Fatal Accidents: In the event of a fatal accident, it will not be necessary to blockade the line awaiting the arrival of the coroner or any other official. If an accident occurs where it is impossible to carry the body to a place of shelter and security, motorman and conductor will put the body on the car and convey it to some suitable place.]

25. [17.] Fire in Car: When there is evidence of car being on fire, motorman will immediately throw overhead switch to OFF and conductor pull down trolley, both motorman and conductor using every effort to prevent passengers becoming panic-stricken or leaving car before it is brought to a stop.

26. [23.] Reports to Be Full and Complete: A full and complete *written* report of every accident, no matter how trivial, and whether occurring on or near the car, must be made by the conductor. Accidents sometimes considered as not worth reporting are often the most serious, troublesome and expensive.

The conductor will obtain the name and residence in full of all witnesses on or near the car, *including badge number of any*

policeman, fireman, private officer, postman or uniformed employee of the Company.

The motorman will assist the conductor in securing the names of witnesses whenever practicable, and will be held responsible for any neglect to render assistance.

In all cases full facts must be obtained and stated in the report, as follows:

The date, exact time, exact place, run and car number, and the direction in which the car was moving, the nature of the accident or collision, and the cause of its occurrence.

The full name and address of the person injured, or whose vehicle was in collision (giving the name of both the driver and the owner of the vehicle).

Ascertain the extent of injuries or damage, if any, before leaving the spot.

In case there has been an accident on the car, and the [conductors] crews change ahead, the conductor taking car on which the accident happened must secure the names of witnesses as above.

In case a person is struck by a car after passing around the rear of a *passing or standing* car, the numbers of both cars must be obtained, and both crews must report the accident.

If an accident is caused by any defect or damaged condition of car, conductor must report the same and its cause.

Accidents to employees will be reported the same as accidents to passengers.

Any trouble or disturbance of a boisterous or quarrelsome character which occurs on a car, or the ejection of a person from a car, will be reported as an accident.

27. [24.] Report Accidents to Inspectors: Conductors and motormen will make a verbal report to the first inspector or official of the Company they meet of any accident, blockade or mishap of any kind. *The depot starter or dispatcher must also be notified.*

28. [25.] Give Information to Proper Persons: No employee shall, under any circumstances, give any information whatever concerning any accident, delay, blockade or mishap of any kind to any person, except to a properly authorized representative of the Company.

29. [26.] Telephone Information: In case of accident involving personal injury or serious damage to property, conductor, *after attending to the case and getting witnesses*, will telephone at once to headquarters, giving notice and particulars of accident.

In case of a blockade, where assistance is required to get cars moving, conductor of car first in block must [perform this duty] *summon assistance. Conductor of the second car, however, will also be held responsible for being sure that assistance has been summoned.* Expense of telephone message will be refunded upon application at office.

G: EJECTMENTS

30. [12.] Ejectments: Ejectments shall be made with the assistance of the motorman after the car has been brought to a stop, using "only such force as is sufficient to expel the offending passenger with a reasonable regard for his personal safety." *No passenger shall be forcibly ejected from the car for any cause whatever without order from an inspector, starter or official of the Company, unless the conduct of the passenger is dangerous or grossly offensive.*

31. [13.] Where to Eject: Any person ejected from a car must be put off at a regular stopping place.

No passenger will be put off at a point where likely to be exposed to danger.

Particular attention must be paid to this rule during bad and inclement weather, late at night, or when a passenger is intoxicated.

32. [14.] Intoxication: No passenger will be ejected from a car for mere intoxication, unless said passenger becomes dangerous or offensive; such passenger must then be ejected with great care and must be guided until free from probable injury.

H: CAR HOUSE RULES

33. [2.] Report for Duty: Regular conductors and motormen must report for duty in sufficient time to permit of the car being started promptly on time from the starting point of the line.

Extra men must report at such time as ordered, or must give notice at least ten minutes before such time. They must not absent themselves after answering roll-call without permission.

I: HEARING BY SUPERINTENDENT

34. [35.] Hearing by Superintendent: A hearing will be given by the Superintendent to every employee who desires to complain. Reports or suggestions for the betterment of the service will always receive consideration.

RULES FOR CONDUCTORS

A: OPERATING RULES

101. Be on Rear Platform: Remain on rear platform when not collecting fares, keeping a lookout for persons desiring to board car. Keep careful watch of passengers to observe requests to stop car. When stops are made at principal streets,

places of amusement, churches, or at any point where a considerable number of passengers enter or leave the car, conductors should be on rear platform until such point is passed. *When descending steep grades, conductor will remain on rear platform.*

102. Announcements: Announce distinctly the names of streets, public places and transfer points when approaching the same.

103. Removing Trolley: Do not remove trolley from wire at end of run, or elsewhere at night, until passengers have alighted from car. (Transferred to end of 104.)

104. [104.] Route Signs: See that route signs are properly displayed on each half trip.

104. [106.] Watching the Trolley: *Trolley rope must be held [keep your hand upon the trolley rope] when passing over switches, crossings, or going around curves.* Should the trolley leave the wire, the conductor must at once pull down the trolley and signal the motorman to stop. After the car has stopped, replace the trolley on the wire, look around and through the car and see if any persons are boarding or leaving same before giving motorman signal to start. See that passengers keep their hands off the trolley rope. *Do not remove trolley from wire at end of run, or elsewhere at night, until passengers have alighted from car.*

105. [107.] Keeping Gates Closed: Front and rear gates on closed cars on the side between the tracks must always be kept closed and securely fastened [when running on the road]. On open cars the guard chains [and guard rails] must be kept fastened and guard rail lowered on the side between the tracks. When gates or chains or their fastenings are broken or out of order, prompt report must be made to superintendent, inspector, starter or foreman.

106. Disabled Motorman: *In case motorman is disabled from any cause while car is in motion, conductor must stop the car as promptly as possible.*

107. Inspect Car: *Conductors will carefully inspect floor, grab-handles, signs and all other parts of car to see that same are in proper condition before car is taken out on the road.*

B: HANDLING PASSENGERS

108. Moving Forward: On closed cars when standing passengers crowd the rear door, request them to PLEASE STEP FORWARD.

109. Seating Passengers: Standing passengers should be directed to vacant seats; and an effort made to provide them with seats where possible.

110. Assisting Passengers: Elderly and feeble persons, women and children should be given assistance getting on and off car when possible. *Crippled, blind or badly intoxicated persons should be assisted to sidewalk if necessary.*

111. Information to Passengers: *Conductors are expected to be familiar with principal points along their route, so as to be able to give information to passengers about streets, parks, connecting or intersecting railway lines, depots, ferries, public buildings, large stores, hospitals, theaters, etc.*

When on the stand at terminals, and when approaching passengers, conductors must announce the route and destination of car.

112. Spitting on Floor: No passenger will be ejected from a car for spitting on the floor. If a passenger violates the rule or law prohibiting spitting, the conductor will call the attention of the passenger to the law prohibiting such conduct and endeavor to persuade the passenger to desist.

113. [105.] Carrying Packages: Passengers must not be allowed to carry bulky or dangerous packages aboard cars.

Employees must not carry packages, letters or newspapers without an order from the proper authority, and must not [do not in any way take possession of, or] assume responsibility for any package which a passenger may bring upon the car, excepting such articles as are to be turned into the Lost Article Department.

They must [do] not hang nor allow articles to be hung on the brake handles.

114. Lost Articles: *Any article left in the car must be turned in promptly at once. Concerning articles found, conductors must not give information to any passenger, but must refer them to the proper office. The name and address of parties giving lost property to conductors must be obtained.*

115. [111.] Dogs in Cars: [No dogs should be allowed on a car except such small dogs as can be carried in the laps of passengers.] *Dogs will not be carried on any car.*

C: HANDLING FARES AND TRANSFERS

116. [113.] Collection of Fares: Fares must be collected promptly after passenger has boarded car and immediately registered. When more than one person boards car at a time, the fares must be registered immediately in the presence of the passenger who paid them before any more fares are collected. *Fares should be collected separately and not in bunches.*

Should a conductor for any reason return a fare to a passenger, or by error register more fares than he collected, he

must not attempt to recover same by omitting to register fares subsequently collected, but should make report of such fact.

117. [114.] Change: When necessary to give change, first register fare, and immediately thereafter give change, *stating the amount received and amount returned.*

Should a conductor have any dispute with a passenger in regard to change, he must make a report in writing to the Superintendent.

Conductors will make change for passengers to the amount of two dollars.

118. [115.] Register Rings: Be careful to see that register rings each fare [and that dial shows it].

119. [116.] Register Out of Order: In case the register gets out of order, stop using it, make report of fares on back of trip report or on blanks supplied for that purpose, and report the fact to the first inspector, or starter, met on the road, and subsequently report to Superintendent.

120. [117.] Transfers in Blockades: In case any line is blocked, it is the desire of the company to carry passengers to their destinations on other lines. Under such circumstances conductors of parallel or intersecting lines will accept transfer tickets accordingly and will issue a transfer on a transfer if necessary. They will also accept transfer passengers without tickets on orders from any inspector or authorized representative of the Company, making report of same on back of trip report.

121. Issuance of Transfers: *Correctly punched transfers shall be issued only on request made at time fare is paid.*

122. Acceptance of Transfers: *Transfers shall be accepted only when properly punched and offered for ride at designated transfer point within the time limit punched on transfer.*

123. Refusing to Pay Fare.—Transfers: *When a passenger refuses to pay fare or presents a defective transfer or ticket, upon which, in the judgment of the conductor, the passenger is not entitled to ride, the conductor must secure the names of as many witnesses to the fact as is possible, whereupon the car must be stopped and the passenger requested to leave.*

If the passenger fails to comply with such request, the facts of the case must be brought to the attention of the first Inspector, Starter or official of the Company who is met, and the conductor must act according to instructions received from such Inspector, Starter or official. In all cases the passenger must be given the benefit of the doubt.

When a passenger who refuses to pay fare requests to be allowed to leave the car the car must be stopped and the person permitted to alight.

RULES FOR MOTORMEN

A: OPERATING RULES

201. Stopping for Passengers: Keep a careful lookout on both sides of the street and bring the car to a full stop for every person who signals, except that when a car has considerable headway, is overcrowded and another car of the same line follows within [the same block, or 200 ft.] 500 ft. passengers should be requested to take the following car.

Cars will stop on signal only at farther corners; at car stations; transfer points, and at points as provided in special orders.

Do not stop cars so as to block cross-streets or cross-walks.

202. Churches and Hospitals and Schools: When passing a church during the hours of service, and at all times when passing a hospital, run slowly and do not ring the gong unless necessary.

Cars must be run slowly and with great care, and gong sounded, in the vicinity of schools when there are children on the street.

203. [204.] Passing Standing and Slowly Moving Cars and over Special Work: When passing standing or slowly moving cars, gong must be rung and car brought to slow speed.

[208. Passing Cars: Never run against switch point of crossover when meeting a car, but slacken speed sufficiently to allow the car moving in the opposite direction to pass before striking switch point. This rule refers particularly to all crossovers having switch points facing opposite to the direction in which the car is moving.] *This rule is omitted entirely and in its place the following paragraphs have been added to new rule 203:*

Run slowly over special work, especially over all facing switch points, and if there is another car moving in the opposite direction on the other track, allow that car to pass before striking the switch point.

Motormen must see that all switches are properly set before passing them, coming to a full stop if necessary.

204. Looking Back While Car Is Moving: *Motorman must not look back either through or around car while it is in motion.*

205. Changing Ends: *When changing ends at terminals motormen must not pass through car.*

206. Entering Terminals: *Motormen must reduce speed when running into terminals to a rate just sufficient to carry the car into terminal.*

207. *Persons Authorized to Run Car: Motormen must not allow any person to run their car except men placed there for instruction or some inspector or duly authorized officer of the Company, known to the motorman to be such. Conductors must not be allowed to run cars. A motorman who has a student "breaking in" in his charge must, under no circumstances, allow the student to handle the car unless he (regular motorman) is at his side, ready to take the brake or controller immediately if necessary.*

208. *Motormen must test brakes, switches, controller, lights and other apparatus and examine sand boxes to insure himself that car is in proper running order before taking it out on the road.*

B: HANDLING CARS

209. *Reversing Cars: [Never use the reversing lever to stop car except to avoid a collision or injuring a person or animal.] Motormen must not use the reverse except to avoid accident or when the brake rigging is disabled.*

Do not reverse [the power] when the brake is set, but release the brake and throw the reverse [the power] handle simultaneously, and, when the reverse [lever] handle is thrown in position, apply the current one point at a time, otherwise the fuse will melt or the breaker will release. Sand should be used when making an emergency stop.

210. *Runaway Car: While descending grade should it not be possible to stop a car equipped with two motors by means of brake, the motorman must immediately turn off hood switch, reverse and advance controller cylinder to last position. In the event of car being equipped with four motors, simply reverse to stop.*

Should a car equipped with two motors start to roll backward while ascending a grade and the brakes be unable to hold it, the hood switch must be immediately turned off and the controller cylinder advanced to last position. Should the car be equipped with four motors if the reverse is set in forward position the car will stop.

211. *Leaving Car: Never leave platform of car without taking controller [or] and reverse handles, throwing off the overhead switch and applying brake. [Be careful to see that the hands point to the "off" mark before taking off controller handle.] Always remove reverse handle first.*

Before leaving car at any point set hand brake sufficiently to prevent car from drifting.

212. *Throwing Overhead Switch[es]: An overhead switch must never be thrown until power is turned entirely off, except in case controller cylinder fails to turn when power is on. It must be thrown by hand only.*

213. *Power off Line: When the power leaves the line the controller must be shut off, the overhead switch thrown and the car brought to a stop; the light switch must then be turned on and the car started only when the lights burn brightly.*

214. *Economical Use of Current: In order to effect an economical use of the electric current it is necessary that the continuous movements of starting and increasing speed should be made gradually. In starting a car let it run until the maximum speed of each notch has been attained before moving handle to the next notch.*

Rapid feeding of controller is injurious to the equipment of the car and causes discomfort to passengers. Controller must never be thrown on last point if car does not start from preceding points. The controller must never be thrown from a higher to a lower notch. Controller must not be held for any length of time on any one point except the first and second running positions. If necessary to run slower than the first running position speed, power must be thrown on and off, and not be taken continuously from a lower notch than that of the first running position.

Do not apply brakes when the current is on.

Do not apply current when brakes are applied.

Do not allow the current to remain on when car is going down grade or when passing over section breakers. Endeavor to run car with the least amount of current, allowing the car to drift without the use of current when it can be done without falling behind time.

A great amount of power can be saved by using judgment and discretion in approaching stopping places and switches by shutting off the power, so as to allow the car to drift to the stopping place or switch without a too vigorous use of the brake.

215. *Release Brakes Before Stop: When brakes are set to make a stop they should always be released or nearly so just before the car comes to a standstill.*

216. *Water on Track: When there is water on the track run the car very slowly, drifting without the use of power whenever possible.*

217. *Sanded Rails: Never run on freshly sanded rails with brakes full on except to prevent an accident. On cars provided with sand boxes, in case of slippery rail, always sand the track for a short distance before applying the brakes.*

218. *"Spinning" of Wheels: Care must be taken particularly*

during snowstorms to avoid "spinning" of the wheels with no forward or backward movement of the car.

219. *Slippery Rail: On a slippery rail do not allow the wheels to slide; as soon as wheels commence to slide the brake must be released and reset.*

Extreme caution must be used to keep car under full control approaching all intersections, junctions, railroad crossings and prominent driveways, being very careful when approaching wagons and other cars, disregarding schedule if necessary.

220. *Do Not Oil Car: Do not oil or grease any part of a car.*

C: REGARDING VEHICLES

221. [205.] *Passing Vehicles: Motormen are cautioned to exercise great care when a vehicle is passing alongside of track ahead of car. Ring the gong vigorously to attract the attention of the person driving, as a warning not to pull in ahead of car; and run cautiously until the vehicle is passed in safety.*

222. [206.] *Fire Apparatus: When any fire department vehicles are observed approaching from any direction, cars must be stopped until such vehicles have passed.*

223. [207.] *Ambulances [and Police Patrol] Patrol and Emergency Wagons: Ambulances [and] police patrol and the emergency wagons of the Company must be allowed the right of way, and when approaching or passing cars must be kept under control to avoid collision.*

D: REGARDING PEDESTRIANS

224. [203.] *Persons Between Cars: Cars moving in opposite directions must not pass at points where persons are standing between the tracks, but must be operated so as not to occupy both tracks at such point simultaneously.*

DENVER CONVENTION TO BE HELD TWO WEEKS EARLIER.

Formal announcement has been made by Secretary B. V. Swenson, of the American Street & Interurban Railway Association, of a change in the date of the Denver convention from the week beginning Oct. 18, 1909, to the week beginning Oct. 4, 1909. The announcement follows:

Although the selection of the date for holding the 1909 convention was given careful consideration by the convention location committee, and the week beginning Oct. 18 seemed to this committee to be the one which would best suit the members of the American and its various affiliated and allied associations, matters have since developed which have indicated to President Shaw that the attendance will be considerably greater if the convention is held during the week of Oct. 4.

While always a subject requiring careful discussion from the standpoint of its convenience to each of our affiliated associations, the question of the convention date was, this year, given even greater consideration by the convention location committee. This was due to the fact that while in late years the second week in October has seemed to be the most desirable one, it was felt that because of its gradual approach toward the first of the month, it had reached a date, this year, which would not prove most convenient to our affiliated bodies. Various other reasons were advanced to indicate that the week of Oct. 13 would prove to be most desirable to the association as a whole. Since this decision was reached, however, a very decided preference has been manifested toward a change of date and a selection of a convention week which would enable our members to take advantage of the attractive railroad rates which continue in effect until Sept. 30 and are good for return until Oct. 31. These rates would enable those wishing to combine pleasure with the serious business of the convention to continue on to the Seattle exposition and to other Pacific coast points with but a comparatively small increase in the round trip fare.

President Shaw was convinced after an investigation that the moving of the convention date ahead two weeks would, undoubtedly, result in a much larger attendance at the 1909 convention, which it is expected will be the greatest in the history of the association. He at once brought the matter to the attention of the executive committee of the American Association and to the attention of the convention location committees of both the American and the Manufacturers' associations. Receiving the approval of these various committees, President Shaw finally decided to change the date, and the convention will be held at Denver Oct. 4 to 8, 1909.

News of Electric Railways

Cleveland Traction Situation

On June 7 the City Council passed the ordinance giving Herman J. Schmidt a grant on Payne Avenue. The ordinance prepared by Judge Tayler was referred to the street railway committee without comment. The ordinance giving the Cleveland Underground Rapid Transit Company a franchise was also passed. The Chamber of Commerce has prepared petitions asking for a referendum vote on the Schmidt ordinance and they were distributed on June 8.

By the withdrawal of Judge R. W. Tayler from the traction negotiations on Monday evening, May 31, and the same action on the part of Horace E. Andrews, president of the Cleveland Railway, on June 2, the situation was rendered very complicated. The administration forces were evidently surprised at the action of Mr. Andrews, as they expected that the threatened grant on Payne Avenue to Herman J. Schmidt would deter Mr. Andrews from withdrawing.

Mayor Johnson and the members of the City Council supporting him evidently did not receive the statement of the plans of Judge Tayler with the earnestness and candidness with which they were prepared and presented to the people. The opening of the meeting on May 31 was marked by jockeying of one kind and another after the statement had been read, and finally drifted to a discussion of the subject of valuation.

In reply to Mayor Johnson's statement that \$7,000,000 or \$8,000,000 might be eliminated by a revaluation, F. H. Goff said that if there is really that much inflated value in the stock of the Cleveland Railway, he owes an apology to the people of Cleveland for the part he took in appraising the property a year ago. Then he discussed the work of a year ago and said that Mayor Johnson had presented the formula upon which the value of all the various items had been found, including pavement, track and ties. The final conclusion of the negotiations, the offer of the securities on the assurance that they were as good as government bonds, the anxiety of the Mayor and his friends to secure money all over the country through the publicity given the new scheme were touched upon. Mr. Goff said he could not understand how the Mayor could be converted to the Bemis theory that the property is worth so much less than the figures found a year ago.

An extension ordinance, giving further rights to Herman J. Schmidt on a number of streets was introduced by Councilman Koch on May 31.

The city reserves the right to reduce the fare below 3 cents if it is shown that the returns are more than 6 per cent on the investment. It may also regulate the schedules and may purchase the property when it so desires. The franchise is to continue until Sept. 9, 1923.

As a result of an assertion made by Mayor Johnson at one of the meetings that he did not know that many street railway patrons had expressed themselves in favor of hastening a settlement, the Retail Board of the Chamber of Commerce has had 15,000 blank petitions prepared asking that the City Council adopt a franchise ordinance to be prepared by Judge Tayler and allow the people to vote upon it. These blanks have been sent out and the merchants are running the following in their advertisements in the daily papers: "Let car riders vote on an ordinance drawn by Judge Tayler. 'Peace' petitions may be signed at our store." Wm. Taylor, Son & Company, one of the largest dry goods houses, devoted a third of its advertising space in Friday evening papers to a discussion of the subject and urged the people to sign the petitions and work for a settlement.

At a special meeting of the City Council on the evening of June 4 an ordinance prepared by City Solicitor Baker, Mayor Johnson and others to take the place of the one introduced on March 22 was passed and signed by Mayor Johnson. It gives the Cleveland Railway a franchise for 25 years, but provides for a cash fare of 4 cents and seven tickets for a quarter with no charge for transfers. This is the maximum fare voted upon by the Council three weeks ago and reaffirmed when the Tayler provisions were being reconsidered a few days ago. This ordinance provides for a revaluation of the properties of the Cleveland Electric Railway and the old Forest City Railway separately. Provisions are also made for funding the company and providing a surplus for working capital. An arrangement has been made for making good any losses that may have been sustained by those who purchased the guaranteed stock of the company. In arriving at conclusions upon these matters the ordinance provides that the company shall choose one man and the city another as arbitrators

and that Judge Tayler shall act as the third, in case the two fail to agree. The right of the city to nominate a purchaser for the property shall be exercised after Jan. 1, 1913, instead of 10 years after the passage of the ordinance, as advised by Judge Tayler. The provisions for the control of operation are about the same as in the original ordinance, as is the arrangement for a street railway commissioner whose salary the company must pay. Euclid Avenue is mentioned in the ordinance only in the provision that it shall not be applicable to that thoroughfare after the present contract with East Cleveland expires, as the Mayor is desirous of forcing the village to make a new contract.

Fender and Wheel Guard Hearing in New York

A rehearing on the question of equipping the surface cars of Manhattan and Bronx Boroughs, New York, with safety devices was held on June 7 before Commissioner Maltbie, of the Public Service Commission, First District.

The first witness was William Bennett, superintendent of the Central Park, North & East River Railroad, who testified at the morning session that the cars on his company's Fifty-ninth Street line were equipped with fixed pilot guards. He thought that an automatic trip fender would be bad on account of the numerous crossings and grade changes on his line. Snow and ice would also trip an automatic guard.

The first witness in the afternoon was A. W. McLimont, who was formerly electrical engineer of the commission and in charge of its fender and wheel guard tests at Schenectady and Pittsburgh. Mr. McLimont is now general manager of the Chicago & Milwaukee Railroad, and came from Chicago to give further testimony at this rehearing. In response to questions by H. H. Whitman, assistant counsel for the commission, Mr. McLimont described the fender and wheel guard tests made under his supervision as chairman of the sub-committee on safety devices and accident prevention. Mr. McLimont admitted that during the official tests he had waived trial of the Sterling pilot guard despite the manufacturer's request. He had told the maker's representative that it was unnecessary to test this device because it was so well known, but he had not been asked by him whether this meant that it was known to be efficient or not. As to his personal experience with this guard, he had operated 60 cars equipped with them in Lima, Peru, where the paving conditions are equal, if not better, than in New York, and the grades perfectly flat. Further, as engineer for the commission, he had studied the wheel guards in New York for a year previous to the tests, and was prepared to affirm his original report that any wheel guard which must be maintained in a fixed position close to the track must be condemned. If the rigid guard is kept at 2½ in. to 3 in. above the rail, the distance is enough to catch a child's limb or a woman's clothing. Such a guard could be effective only if it were carried 1 in. above the rail, but at that height it could not be kept in order. As to the testimony on the Fifty-ninth Street grades, he was certain that if they were great enough to trip an automatic guard held 5 in. above the rail, they would surely make it impossible to maintain a fixed guard.

Mr. McLimont also confirmed his original report in which, referring to rescues of the clothed female dummy, he had said that wheel guards held down by springs made better pick-ups than those operated by gravity only. The springs should exert not less than 100 lb. pressure. He did not see much force in the snow and ice objection to automatic guards, for if there are 4 in. or 5 in. of snow on the track, traffic would be interrupted from that account alone. The Toronto Railway Company, for instance, maintains successfully at 4 in. above the rail a projecting automatic fender which is more sensitive than automatic wheel guards.

G. W. Linch, receiver for the Second Avenue Railroad, said that it was his intention to add more wire to the pilot guards and attach boards at the sides. Mr. McLimont said that in his judgment the fixed guards on the Second Avenue line could not be effectively maintained if carried 2½ in. above the slot rail. Mr. Tolles, counsel for the Second Avenue Railroad Company, then asked the witness numerous questions on the construction details and strength of fixed guards. In conclusion, Mr. McLimont summarized, at Commissioner Maltbie's request, the comparative merits of fixed and automatic wheel guards. He added that, under the conditions pertaining on Second Avenue and on Fifty-ninth Street, New York, an automatic guard would be more efficient.

The hearing was then adjourned to June 9.

Transit Affairs in Philadelphia

After a conference of the State Railroad Commission and the executive committee of the City Club of Philadelphia in Harrisburg on May 28, Nathaniel Ewing, chairman of the commission, ruled that he and his associates had no authority to make an examination of the financial affairs of the Philadelphia Rapid Transit Company, but could consider only the physical accommodations provided. In response to a question by George Burnham, Jr., president of the City Club, Chairman Ewing, of the Railroad Commission, said that the fare question involved a contract which the courts would have to pass upon.

Under date of June 7 John B. Parsons, president of the Philadelphia Rapid Transit Company, sent a letter to William H. Longstreth, chairman of the Committee of Fifteen, in which he said:

The board of directors of the Philadelphia Rapid Transit Company, at their regular meeting held this day, received and considered your communication of May 26 last, and have instructed me to reply as follows:

"The business accounts and management of the company are open to the regular audit of the city controller. The annual reports of the company, and its returns made to the auditor general and the secretary of internal affairs at Harrisburg, contain the fullest statements respecting the operation, management and condition of the company. The public address of the Retail Merchants' Association, published at the time that body presented the draft of its suggestion for a proposed contract between the city and the company, contains a comprehensive, impartial and lucid statement of the street railway situation in this city. All the papers and documents above referred to are easily accessible to your committee, or any citizen for such inspection or scrutiny as may seem proper. As to your specific proposition, I am instructed to say that neither in itself, nor with the conditional ultimatum, which you attach to it, could it be entertained."

Transit Affairs in New York

On June 4 the Board of Estimate approved the application of the Hudson & Manhattan Railroad for permission to extend its subway from Sixth Avenue and Thirty-fourth Street to the Grand Central Station at Fourth Avenue and Forty-second Street. The extension has already been passed upon favorably by the Public Service Commission, and as soon as the Mayor has signed the franchise and the necessary consents of abutting property owners have been obtained, the actual work on the new tunnel will be started. It is estimated that the through line between the Grand Central Station and New Jersey will be in operation within two years.

The Public Service Commission has forwarded to the Board of Estimate and Apportionment a requisition for the sum of \$1,500,000 to be expended in lengthening the station platforms in the subway. A proposition to this effect was made by Theodore P. Shonts, president of the Interborough Rapid Transit Company, some weeks ago, when he submitted an informal application for authority to build the Lexington Avenue and Seventh Avenue extensions of the subway. At that time the law did not permit the construction of any such extensions by private capital as was proposed, but inasmuch as the law did permit the lengthening of station platforms that part of the proposition was at once approved. The express stations will be lengthened so as to accommodate 10-car trains and the local platforms to accommodate 8-car trains.

Max E. Schmidt, president of the Continuous Transit Securities Company, has submitted an amended offer to the Public Service Commission in regard to the construction of moving-platform routes. He said that, in view of the passage of the rapid transit law amendments, his company was ready to bid on the construction and operation of a moving-platform subway under Broadway from Union Square to Times Square. An arcade will be built in connection with this route if the commission approves. Two alternative moving-platform routes were also proposed in case the commission did not approve of the Broadway arcade plan. One of the alternative routes is a crosstown subway under Thirty-fourth Street from Second Avenue to Ninth Avenue. This is the original moving-platform route, for permission to build which an application was made several years ago by the same company to the Rapid Transit Commission. The other alternative route apparently contemplates the operation of the bridge loop subway, which is nearing completion. As proposed by Mr. Schmidt, this route would begin at the Brooklyn plaza of the Williamsburg Bridge, would cross the bridge on an elevated structure to the Manhattan plaza, and would con-

tinue by subway under Delancey Street and Centre Street to the Manhattan end of the Brooklyn Bridge, thence under Park Row, Nassau Street, Broad Street and Beaver Street to a connection with the present subway at Bowling Green.

Program of the Annual Meeting of the Street Railway Association of the State of New York

The 27th annual convention of the Street Railway Association of the State of New York will be held at the Fort William Henry Hotel, Lake George, N. Y., June 29 and 30, 1909. The following program has been arranged:

TUESDAY, JUNE 29.

Morning Session, 10 a. m.: Roll call; Reading of Communications and Minutes of Previous Meetings; President's Address; Reports of Executive Committee, Treasurer and Secretary; Reports of Committees—(a) Electric Express and Freight Service; (b) City Rules; (c) Classification of Accounts. Paper, "Electric Railway Accounting," by A. L. Linn, Jr., general auditor, New York State Railways. Discussion—W. H. Davies, comptroller, Delaware & Hudson Company; H. M. Beardsley, secretary, Elmira Water, Light & Railroad Company; J. C. Collins, secretary, New York State Railways. Miscellaneous Business.

Afternoon Session, 2 p. m.: Reading Communications. Paper, "Schooling of Trainmen," by N. W. Bolen, General Superintendent Public Service Railway Company, Newark, N. J. Discussion—George L. Radcliffe, superintendent, Schenectady Railway Company; John E. Duffy, superintendent, Syracuse Rapid Transit Railway Company; W. R. W. Griffin, superintendent, New York State Railways Company. Quarterly Meeting Reports—"Use of Curtains in Car Vestibules," "Signaling Interurban Cars at Way Stations," "Carrying Musical Instruments on Passenger Cars."

The above reports of committees submitted at the Schenectady quarterly meeting will be presented for discussion and definite action by the association. Miscellaneous Business; Appointment of Nominating Committee.

WEDNESDAY, JUNE 30.

Morning Session, 10 a. m.: Reading of Communications; Miscellaneous Business. Papers—"Latest Developments in Electric Railway Apparatus," by C. D. Eveleth, General Electric Company; J. L. Davis, Westinghouse Electric & Manufacturing Company. Election of Officers; Adjournment.

An attractive program of entertainment has been provided.

On Tuesday, at 10:30 a. m., through the courtesy of the president, cars will be provided for a trolley trip to Warrensburg. At 3 p. m. there will be a bridge whist tournament for the ladies. On Wednesday, at 10:30 a. m., clock golf and tennis tournaments will be held, and at 2 p. m. there will be a steamboat trip around Lake George, returning in time for evening trains.

J. H. Stedman, of Rochester, N. Y., will act as toastmaster at the banquet, which will be held on Tuesday evening, at 7 o'clock. Banquet tickets will be provided to members, associate members, guests, and the ladies. Each allied member will receive one banquet ticket. Extra banquet tickets will be sold at \$5 each.

Members are requested to bring their badges and extra bars will be provided free. A charge of \$1 each will be made for extra badges.

Accommodations at the Fort William Henry Hotel can be arranged by communicating directly with the hotel manager, J. F. Wilson, 243 Fifth Avenue, New York City. The hotel will open on June 26.

No provisions have been made for a general exhibit of appliances and apparatus by allied members, but any exhibit will be welcomed, and arrangements for space can be made directly with the proprietors of Fort William Henry Hotel.

Outing of the New England Street Railway Club.—The June outing of the New England Street Railway Club will be held on Tuesday, June 22, on Narragansett Bay, Rhode Island. The program will be announced in detail as soon as the arrangements are fully completed.

Wisconsin Electric & Interurban Railway Association.—The Wisconsin Electric & Interurban Railway Association and the Northwestern Electrical Association will hold a joint meeting at Waupaca, Wis., on June 28 and 29, to discuss operating subjects. The headquarters will be at the Grand View Hotel on the Chain-o-Lakes, which is controlled and operated by Irving P. Lord, president of the Waupaca Electric Light & Railway Company.

Maryland Cabinet to Consider Public Utilities Matters.—Gov. Crothers, of Maryland, has issued a call for a meeting of the Maryland State cabinet on June 17, at 10 a. m., to

consider the question of a public-utilities commission and the regulation of public-service corporations in general. The meeting will be held in the Governor's office in the Union Trust Building, Baltimore.

Street Railway Men's Day at Seattle Exposition.—At the request of the officers of the Seattle (Wash.) Electric Company the managers of the Alaska-Yukon-Pacific Exposition have designated June 28 as street railway men's day. The Seattle Electric Company will so arrange its schedules that all its employees will be afforded an opportunity of attending the exposition on the day set aside for them.

Ohio Electric Railway's Columbus Ordinance Passed.—At a meeting of the City Council of Columbus, Ohio, on May 31 the Ohio Electric Railway was granted a 25-year franchise on its agreement to build a union station at South Third Street and Rich Street to cost at least \$175,000. The company was also given permission to build a line on Town Street, between Third Street and Rich Street, so that cars can be operated to the new station. In the construction of this line the company will be permitted to lay T-rails. The passage of the measure means that the loop on Gay Street, over which all the interurban cars operate into the business district, will be removed, but arrangements will be made to run the cars of the Columbus, Delaware & Marion Railway to the depot on Gay Street. The franchise is before the Mayor for approval.

Canadian Company Offers to Sell to City.—The Kingston, Portsmouth & Catarqui Electric Railway, Kingston, Ont., has through H. W. Richardson, president of the company, offered to sell its property to the city of Kingston. The company purchases power from the city, and the city and the company have recently been unable to agree upon the rate that should be charged the company for current. Mr. Richardson, in a communication to the Council, said: "We will transfer the railway and all that the company owns in the city, including Portsmouth and the township of Kingston, to the corporation of the City of Kingston, you paying us the amount invested since the reorganization, plus interest thereon at 6 per cent. Then the question of the cost of power would not need to be discussed." The matter has been referred to the light, heat and power committee of the Council.

Meeting of the Oklahoma Electric Light, Railway & Gas Association.—At the meeting of the Oklahoma Electric Light, Railway & Gas Association in Oklahoma City on May 18, 19 and 20, the name of the association was changed to the Oklahoma Public Utilities Association and Sapulpa was selected as the next meeting place. The following officers were elected: Ed C. Reynolds, Sapulpa, president; Fred J. Bedford, Lawton, first vice-president; Noel R. Gascho, Alva, second vice-president; Charles E. Lehman, Vinita, third vice-president; Galen Crow, Guthrie, secretary; H. G. Stettmund, Chandler, treasurer; F. H. Tidnam, Oklahoma City; Arch Leonard, Tulsa; H. H. Stephens, El Reno; Anton H. Classen, Oklahoma City, and F. E. Bowman, Ada, executive committee. Galen Crow was elected as the official representative of the association at Guthrie, the capital of Oklahoma, to represent member companies before State departments.

Annual Meeting of the Canadian Street Railway Association.—The annual meeting of the Canadian Street Railway Association was held at the Royal Alexandria Hotel, Winnipeg, Manitoba, on May 31, June 1 and June 2. The sessions were private and no reports of the proceedings were made available for publication. The following officers were elected: Duncan McDonald, manager of the Montreal Street Railway, president; J. Anderson, manager of the Sandwich, Windsor & Amherstburg Railway, vice-president; Acton Burrows, managing director of the *Marine and Shipping World*, Toronto, secretary; Patrick Dubee, secretary of the Montreal Street Railway; E. A. Evans, manager of the Quebec Railway, Light & Power Company; J. E. Hutcheson, superintendent of the Ottawa Street Railway; R. J. Fleming, manager of the Toronto Railway, and C. B. King, manager of the London Street Railway, executive committee. The office of assistant secretary was created and Aubrey Acton Burrows, of the *Marine and Shipping World*, Toronto, was elected to that office. While in Winnipeg, the delegates to the convention were entertained at lunch by W. Phillips, general manager of the Winnipeg Electric Railway, and were escorted by him on an inspection trip of the city and suburban lines and power houses of the company. The selection of the meeting place for 1909 was left in the hands of the executive committee. Among those in attendance were: W. R. McRae, master mechanic, and J. H. Forrest, accounting department, Toronto Railway; Patrick Dubee, secretary, and N. P. Baker, assistant general manager, Montreal Street Railway; H. M. Hooper, secretary-treasurer, W. Z. Earle, manager, R. B. Emerson, J. McCulloch, St. John Railway; F. S. Livingston, general freight and passenger agent, Toronto & York Radial Railway; George Royer,

general manager, Toronto & Suburban Railway; J. D. Fraser, secretary-treasurer, Ottawa Electric Railway; C. B. King, manager, London Street Railway; James Brampton, treasurer, Sandwich, Windsor & Amherstburg Railway; W. Phillips, general manager, Winnipeg Electric Railway.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Connecticut.—The joint select committee, consisting of nine members and two Senators, appointed to consider the subject of public utility legislation, began its hearings in the hall of the House on June 10. Charles S. Mellen, president of the New York, New Haven & Hartford Railroad, expected to appear before the committee on the first day, but as he was unable to be present he had Edward D. Robbins, attorney for the company, submit a letter for him. Mr. Mellen strongly opposes the proposed law and contends that the measure would injuriously interfere with the financial operations of the New York, New Haven & Hartford Railroad and seriously delay the development of the road. Mr. Mellen said he could not conceive a board which would conscientiously wish to hamper the financial arrangements of the largest business corporation in New England, but that even "assuming the most perfect good will toward the company on the part of every member of the proposed commission, the working of the machinery of financial control will inevitably act injuriously upon our finances." He also deplored the fact that the plans of the company would have to be prematurely revealed at public hearings, a proceeding that in most cases would work greatly to the embarrassment of the company. Mr. Mellen also said that the assumption that there should be public interference with the methods of raising new capital is an economic fallacy. Mr. Mellen said that the New Haven road had not issued any shares since it was organized in 1872 at less than 100 cents on the dollar; but that on the other hand, it has during that time received \$22,808,537 in premiums on stock issued. Mr. Robbins also spoke in person for the New Haven road and its interests. P. H. Woodward and Ralph O. Wells, of the special committee which drafted the measure, spoke for it. The topic before the committee on June 2 was rates, and the session was continued until 5:30 p. m. Representatives of the Southern New England Telephone Company and of the lighting companies were the principal speakers. There was a short digression, however, during which Mr. Robbins was called upon again. In reply to a question as to whether he would object to the bill if the criticisms he had made were met, he said that he could not say unless he could study the bill carefully in detail. He expressed the opinion that the New York law has done more harm than good and said that the proposed law in Connecticut would render nugatory the efforts of his own company and other public servants in the State. The subject of rates was continued at the hearing on June 3. Mr. Robbins, for the New Haven road, said that rates over electric railways were originally based upon the principle of the short city haul, but that the 5-cent unit has been continued and applied to the suburban lines until in many cases companies have been compelled to adopt a new unit or to re-adjust fares so as to protect their property. He then cited the Massachusetts companies which have increased fares on this account. The next subject considered was the control of the management and operation of public service companies. W. R. Willcox and Milo R. Maltbie, of the Public Service Commission of the First District of New York, were introduced. Mr. Maltbie said that the idea of the control of public service corporations of the State of New York was not born with the creation of the commission in New York, but was the outcome of experience with railroad and gas commissions. Mr. Maltbie said that the Public Service Commission of the First District of New York spends between \$900,000 and \$1,000,000 a year, of which \$250,000 is for pure regulation, while the Public Service Commission of the Second District of New York spends about \$300,000 a year. He does not think the expense for a commission in Connecticut would exceed that of the commission of the Second District in New York. Mr. Maltbie said that the Public Service Commission of the First District of New York had not acted as a deterrent in preventing the investment of money, and that at this time applications are before the commission for grants that will involve the expenditure of about \$200,000,000. Mr. Willcox spoke in confirmation of the statements made by Mr. Maltbie. He said that one of the most difficult problems of the commission is to determine where regulation ends and management begins, and cited the recent recommendations of the commission regarding fenders as an example. Mr. Willcox said that stockholders in corporations coming under the jurisdiction of a public service commission should not be eligible for appointment to the commission, stating that the reason for this would soon be realized after they had entered upon their duties as commissioners. The hearing was then adjourned until June 8.

Financial and Corporate

New York Stock and Money Market

June 8, 1909.

There has been an active and advancing market in Wall Street throughout the last week. Although there was some pause in the advance to-day, the activity remained and there were no material price recessions. The day was devoted largely to the affairs of the Southern Pacific Company, its board of directors being in session almost all day considering plans for the retirement of the preferred stock. The common and preferred issues of this company advanced as much as 5 points during the day and each closed with a net gain of more than 3 points. The feature of the week was the marked advance in all steel stocks.

The bond market continues to be strong and money is plentiful and cheap. Rates to-day were: Call, 1¼ to 2 per cent; 90 days, 2½ to 2¾ per cent.

Other Markets

Philadelphia Rapid Transit stock was still the active feature of the market in Philadelphia. More than 50,000 shares were sold during the past week. The stock went below 30 to-day and closed at 30½. Union Traction was also reasonably active.

There was little trading in traction issues on the Chicago market during the week. Chicago Railways, Series I and 2, were sold to a small extent with nominal price changes. Subway was less active.

In the Boston market, little interest was shown in traction securities. Massachusetts Electric preferred, Suburban preferred and Boston Elevated have been the only issues showing any particular life. Price changes were insignificant.

Bonds of the United Railways Company continued active in the Baltimore market. Closing prices to-day were: funding 58, 80; incomes, 57, and 48, 87½.

The only traction securities sold at the auction in New York last week were \$2,000 Brooklyn Rapid Transit 5 per cent bonds, at 106½ and interest.

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

	June 1.	June 8.
American Railways Company.....	45¾	46
Aurora, Elgin & Chicago Railroad (common).....	*38	43¾
Aurora, Elgin & Chicago Railroad (preferred).....	*87½	87
Boston Elevated Railway.....	130	130¾
Boston & Suburban Electric Companies.....	15½	*16
Boston & Suburban Electric Companies (preferred).....	*71	70
Boston & Worcester Electric Companies (common).....	*11	10
Boston & Worcester Electric Companies (preferred).....	*56	54
Brooklyn Rapid Transit Company.....	79½	81¾
Brooklyn Rapid Transit Company, 1st ref. conv. 48.....	88	89
Capital Traction Company, Washington.....	at 135¾	*136
Chicago City Railway.....	190	at 190
Chicago & Oak Park Elevated Railroad (common).....	3	*3
Chicago & Oak Park Elevated Railroad (preferred).....	*14	*14
Chicago Railways, pteptg. ctf. 1.....	*110	at 109
Chicago Railways, pteptg. ctf. 2.....	38½	438
Chicago Railways, pteptg. ctf. 3.....	*28	at 26½
Chicago Railways, pteptg. ctf. 4.....	10¼	at 10
Cleveland Electric Railway.....	*78	*78
Consolidated Traction Company of New Jersey.....	479	479
Consolidated Trac. Co. of N. J., 5 per cent bonds.....	at 107	at 107
Detroit United Railway.....	58	59½
General Electric Company.....	161¼	159½
Georgia Railway & Electric Company (common).....	86	90¾
Georgia Railway & Electric Company (preferred).....	*85	85
Interborough-Metropolitan Company (common).....	16½	16¼
Interborough-Metropolitan Company (preferred).....	46	45¼
Interborough-Metropolitan Company (4½s).....	78¾	78¾
Kansas City Railway & Light Company (common).....	50¼	at 50½
Kansas City Railway & Light Company (preferred).....	85¾	86
Manhattan Railway.....	*147	at 148
Massachusetts Electric Companies (common).....	*12½	12½
Massachusetts Electric Companies (preferred).....	*60½	67
Metropolitan West Side, Chicago (common).....	*18	at 19
Metropolitan West Side, Chicago (preferred).....	*53	at 55
Metropolitan Street Railway.....	*28	at 27½
Milwaukee Electric Railway & Light (preferred).....	*110	*110
North American Company.....	81¾	83½
Northwestern Elevated Railroad (common).....	*24	at 24
Northwestern Elevated Railroad (preferred).....	60¼	at 70
Philadelphia Company, Pittsburg (common).....	41¼	at 41¾
Philadelphia Company, Pittsburg (preferred).....	43½	at 43½
Philadelphia Rapid Transit Company.....	32	at 30¾
Philadelphia Traction Company.....	493	492
Public Service Corporation, 5 per cent col. notes.....	at 100¾	*100¾
Public Service Corporation, ctf. 5.....	80	at 80¾
Seattle Electric Company (common).....	108	*108
Seattle Electric Company (preferred).....	100	102
South Side Elevated Railroad, Chicago.....	*58	at 56½
Toldeo Railways & Light Company.....	10	10
Third Avenue Railroad, New York.....	30	30
Twin City Rapid Transit, Minneapolis (common).....	*104¼	*104½
Union Traction Company, Philadelphia.....	55¼	at 56
United Railways & Electric Company, Baltimore.....	*12¾	at 12¾
United Railways Inv. Co., San Francisco (common).....	438	38½
United Railways Inv. Co., San Francisco (preferred).....	455	56
Washington Railway & Electric Company (common).....	443	*125½
Washington Railway & Electric Company (preferred).....	4908	*90¾
West End Street Railway, Boston (common).....	92	493
West End Street Railway, Boston (preferred).....	105½	107
Westinghouse Electric & Manufacturing Company.....	84	85
Westinghouse Elec. & Mfg. Company (1st pref.).....	121	at 124

a. Asked.

*Last sale.

Annual Report of the United Railways Investment Company

The annual report of the United Railways Investment Company for the year ended Dec. 31, 1908, shows a total income of \$1,558,790, of which \$1,452,672 was from dividends on stocks owned, and \$106,118 represented interest on loans and accounts receivable. Expenses were \$50,586, and interest and other charges against income, \$1,243,159, leaving a net income for the year of \$265,045.

Ernst Thalmann, the president, states in his report:

"The position of the company during the past year has shown a constant and continuing improvement which has continued during the current year, as evidenced by the gross earnings for the quarter ended March 31, 1909, set forth in the preliminary reports of the Philadelphia Company and the United Railroads of San Francisco.

"The following is a comparative statement of gross earnings for the quarter ended March 31, for the years 1907, 1908 and 1909, based on such reports:

Quarter ended March 31—	1907	1908	1909
Philadelphia Company ...	\$5,149,664	\$4,795,428	\$4,811,229
United Railroads of San Francisco	1,591,054	1,559,689	1,716,626

"Despite the serious falling off in gross earnings of the Philadelphia Company, due to the recent depression in Pittsburgh and surrounding territory, its net earnings have been sufficient to warrant the maintenance of the dividend of 6 per cent and to carry to improvements and betterments out of earnings a sum of \$782,977.81.

"During the year 1908, the United Railroads of San Francisco, for the first six months ended June 30, showed a deficit of \$227,390, which was written off to profit and loss. For the six months ended Dec. 31, 1908, that company showed a surplus of \$200,400.08.

"During the year 1908 the United Railroads of San Francisco paid no dividend in cash or scrip, but in 1909, in February, it paid its first dividend on its first preferred stock as of Jan. 1, 1909, out of the surplus earnings made during the six months from July 1, 1908, to Dec. 31, 1908.

"If the increase in earnings of that company be continued, of which there is every reasonable prospect, having in view the improved conditions in San Francisco, the United Railroads of San Francisco in the course of the current year should have a considerable surplus over and above the dividend on its first preferred stock which will be available for dividends on its ordinary preferred stock, although, in view of the requirements of that company for further facilities to meet its increasing business it probably will be considered by the directors of that company wiser not to pay any cash dividend thereon during the current year.

"In the report to the stockholders for the year 1907, the board of directors called attention to the fact that the operations of the United Railroads of San Francisco had been greatly hampered by the lack of a proper supply of power under its own control. Since that time this matter has had the careful and continued attention of your board, with the result that in May, 1908, negotiations were opened with the committee representing the security holders of the Stanislaus power development, and these negotiations continued through the year, with the result that your board is now in a position to submit a proposition covering the purchase of that property, full advices of which you have received under the letter from the president of this company and the letter of the engineers of the company, accompanying the notice for the special meeting to take action with respect to such proposed acquisition. The letter of Ford, Bacon & Davis, the engineers of the company, sets out more fully the nature and character of the property proposed to be acquired and their views as to the value to this company of the acquisition of such property.

"The surplus earnings of this company during the year mentioned above have been applied toward the liquidation and extinguishment of its floating debt, which has been reduced from \$2,443,803.75 to \$1,653,673.04, a figure which includes a contingent liability of \$50,000. This floating indebtedness has since been further considerably reduced."

Annual Report of the Norfolk & Portsmouth Traction Company

Gross earnings of the Norfolk & Portsmouth Traction Company and allied and affiliated companies in the year 1908 were \$1,877,930, a decrease of \$738,528, or 28.2 per cent from the preceding year, when traffic had the advantage of the attendance at the Jamestown Exposition. When the gross earnings are compared with those of the more normal year of 1906, \$1,719,546, the increase is shown to be satisfactory. The operating ratio for the company and the

affiliated properties was 58.82 per cent in 1908, as compared with 63.08 per cent in 1907 and 61.89 per cent in 1906. Earnings of the properties for three years compare as follows:

	1908.	1907.	1906.
Gross earnings.....	\$1,877,930	\$2,616,458	\$1,719,546
Operating expenses.....	1,104,346	1,655,654	1,113,883
Net earnings.....	\$773,584	\$960,804	\$605,663
Other additions or deductions.....		2,283	170
Gross income.....	\$773,584	\$958,521	\$605,833
Fixed charges: Taxes, interest and rentals.....	790,630	704,809	501,556
Surplus.....	\$17,046	* \$253,712	\$104,277

§ Deficits.
* From this operating surplus of 1907 there was charged off \$126,507; actual surplus carried forward, 1907, \$127,205.

Illustrating the return to normal conditions of business and earnings, John Blair MacAfee, the president, gives the following comparative figures, stating that the more favorable conditions which they indicate have continued during 1909, and that gross earnings so far this year show an increase of 18 per cent over the corresponding period of 1908:

	1908.	1907.	1906.
Gross receipts for October.....	\$150,795	\$258,515	\$142,151
Operating expenses for October.....	88,316	158,954	92,451
Gross receipts for November.....	156,732	202,006	145,950
Operating expenses for November.....	87,332	144,252	86,910
Gross receipts for December.....	169,168	167,739	153,964
Operating expenses for December.....	93,427	139,307	98,963

Mr. MacAfee says in his report: "While there has been considerable increase in the fixed charges of the company, this increase represents interest upon properties acquired and improvements made not only to take care of existing conditions, but to provide for the exceptionally rapid growth of the community served. These investments have measurably realized the expectations stated in the report of last year, and while the increase in gross earnings compared with the year 1906, when business was abnormally stimulated by the preparations incident to the Jamestown exposition, is comparatively small, there has been a large reduction in operating expenses primarily due to the capital expenditures already referred to.

"The year 1908 was a most important one in your company's history. The insolvency of the Jamestown exposition in November, 1907, had a disastrous effect upon commercial and industrial affairs in Tidewater Virginia during a great part of 1908. Coming at the lowest ebb of a great financial depression, many individuals and corporations with their main offices and places of business in Norfolk and vicinity were forced into bankruptcy.

"During the latter part of 1908 general business conditions improved materially. Building operations, which had almost ceased during the early spring, were renewed with vigor and more dwellings were erected during the latter part of 1908 than in the city's history, in any similar period, excepting only 1907. The Virginian Railway has been completed and early in 1909 complete operation will begin over the line of that road. The completion of its coal terminals at Sewell's Point will have a tendency to largely increase the earnings of your Norfolk & Atlantic Terminal railroad.

"The governing authorities of both Portsmouth and Norfolk have dealt with us agreeably respecting the item of new paving. During the past year the total charge to new paving account was \$9,930, and the repairs to paving during 1908 amounted to \$8,925, which was charged to operation.

"While the Norfolk & Ocean View Railway had a deficit from operation of \$5,340 for the year 1907, the report for 1908 shows a net earning of \$7,906 and a decrease in operating expenses of \$13,245.

"In 1908 we expended \$355.85 per mile of track maintenance, in 1907 \$468.58 per mile, in 1906 \$358.34 per mile and in 1905 \$378.59 per mile."

The following railway statistics are published in the report:

	1908.	1907.	1906.
All divisions.....			
Fare passengers.....	18,223,716	29,239,843	18,131,085
Free passengers.....	792,029	1,043,820	520,939
Transfer passengers.....	1,520,137	2,032,503	1,436,213
Total all divisions.....	20,535,912	32,316,166	20,088,237

Gainesville (Ga.) Electric Railway.—At the resale of the property of the Gainesville Electric Railway at foreclosure on June 1, R. L. West, Atlanta, Ga., representing the bondholders, was the successful bidder. The purchase price was \$104,000.

Kingston (N. Y.) Consolidated Railroad.—Fred T. Ley, Harold A. Ley and Leo Ley, of Fred T. Ley & Company,

Springfield, Mass., have secured control of the Kingston Consolidated Railroad through the purchase of the interests of August Belmont and John I. Waterbury, president of the Manhattan Trust Company, New York. A number of improvements have been decided upon and contracts for the necessary materials and supplies have been let.

Meadville (Pa.) Traction Company.—Prominent interests in the Meadville Traction Company have engaged Ford, Bacon & Davis, New York, N. Y., to make a complete financial and engineering report regarding the property of the company.

Missouri Water, Light & Traction Company, Nevada, Mo.—The property of the Missouri Water, Light & Traction Company was sold under foreclosure recently by Hiram Phillips, receiver, to A. Mitchell, St. Louis, Mo.

Third Avenue Railroad, New York, N. Y.—It is stated that the reorganization plan of the Third Avenue Railroad is well under way and that it will be formally announced within a few weeks. It is reported that the plan will require bondholders to authorize the expenditure of \$7,500,000. Of this sum, \$1,000,000 will probably be spent for new track, \$2,500,000 will be employed to take up the certificates issued by Frederick W. Whitridge, receiver, and the remaining \$4,000,000 will be used for improvements to the car barns, the rolling stock and the power station equipment.

Pacific Traction Company, Tacoma, Wash.—The Pacific Traction Company has filed for record a mortgage to secure an issue of \$5,000,000 bonds.

Toledo Railways & Light Company, Toledo, Ohio.—The Toledo Railways & Light Company has arranged with Blair & Company, New York, for an extension of the time of payment of the 5 per cent consolidated first mortgage gold bonds of the Toledo Traction Company and the 5 per cent first mortgage bonds of the Toledo Consolidated Street Railway until Jan. 1, 1912, with interest at the rate of 6 per cent per annum, payable semi-annually, subject to redemption at the option of the Toledo Railways & Light Company at any time on 60 days' notice by publication, as provided in the agreement for extension. Holders of bonds desiring to avail themselves of the privilege of extension must present the bonds at the office of Blair & Company on or before June 28, 1909, to have annexed thereto certificates of extension and new coupon sheets. Holders of bonds who do not desire the extension will receive par for their bonds upon delivering them on or after July 1, 1909, to Blair & Company.

Westchester Electric Railroad, Mt. Vernon, N. Y.—Justice Tompkins of the Supreme Court, sitting at White Plains, has denied the motion to set aside all the dissolution proceedings of the Westchester Electric Railroad, now in the hands of a receiver, on the ground that the proceedings are illegal.

NEW PUBLICATIONS

Starkstrometchnik (Heavy Electric Currents). Berlin, Germany: Wilhelm Ernst & Son, 1909; 1168 pages, with index and 602 illustrations. Price, 20 marks, paper bound, or 21 marks, cloth bound.

This handbook has been prepared by E. von Rziha and I. Seidener, two Vienna engineers, with the assistance of numerous specialists. As the title indicates, the bulk of the data relates directly to applications of electricity on a large scale, as in lighting, manufacturing, traction and electro-chemistry. This work differs considerably from American handbooks inasmuch as much of the material is treated from the standpoint of the designer. The treatment of electric motors, for instance, is thoroughly mathematical, not confining itself simply to descriptions and derived formulas. There are chapters on gas engines, turbines, single-phase motors and other up-to-date power subjects.

La Définition et la Mesure Industrielles de L'Accélération des Trains. By C. O. Mailloux, E.E., M.S. Paris: Gauthier-Villars. 12 pages. Illustrated.

This is a reprint from *La Revue Electrique* of Nov. 30, 1908, which gives the complete text of the original paper presented, in French, by the author, before Section V of the International Electrical Congress, at Marseilles, in September, 1908. The reprint also contains the discussion of the paper, by M. Legouez, managing director of the Paris "Metropolitan" (Subway system), who was one of the vice-presidents of Section V. It also contains a very intelligent and interesting editorial by M. Blondin, the well-known electrical writer and authority, who was for many years the editor of *L'Eclairage Electrique* and is now editor of *La Revue Electrique*. A condensed and paraphrased English translation of the paper was published in the *ELECTRIC RAILWAY JOURNAL* of Feb. 13, 1909, page 277, with an editorial comment, page 270.

Traffic and Transportation

Ticket Sales on Subway and Elevated Lines in New York

The Public Service Commission of the First District of New York has made public the reports of ticket sales on the subway and elevated lines of the Interborough Rapid Transit Company for 1907 and 1908. The ticket sales in the subway increased from 182,559,990 in 1907 to 220,991,212 in 1908. The ticket sales on the elevated railroad system, however, decreased from 289,799,576 in 1907 to 273,855,136 in 1908 or 15,944,440. This was owing partly to the loss of passengers to the subway system and to the falling off in travel due to the depression following the financial panic of October, 1907. As the subway gained 38,431,222, however, the loss on the elevated lines was more than compensated, the total traffic of both subway and elevated showing a net increase for the year of 12,486,782 passengers.

The total sales for 1907 and 1908 on the subway and elevated system follow:

	1907.	1908.
Elevated—Second Avenue Line.....	42,643,933	39,286,507
Elevated—Third Avenue Line.....	129,519,023	122,085,638
Elevated—Sixth Avenue Line.....	85,234,445	82,945,171
Elevated—Ninth Avenue Line.....	32,493,075	29,537,820
Grand total, Elevated.....	289,799,576	273,855,136
Subway.....	182,559,990	220,991,212
Subway and Elevated Systems.....	472,359,566	494,846,348

The ticket sales in detail for the two years at all stations follow:

SUBWAY TICKET SALES.

Station.	1907.	1908.
Atlantic Avenue.....	6,857,990	6,857,990
Nevins Street.....	2,055,762	2,055,762
Hoyt Street.....	1,973,176	1,973,176
Borough Hall.....	10,724,367	10,724,367
South Ferry.....	2,519,715	1,967,728
Bowling Green.....	1,883,683	3,507,475
Wall Street.....	4,797,924	6,522,220
Fulton Street.....	7,693,000	9,793,288
City Hall.....	752,271	653,413
Brooklyn Bridge.....	23,175,615	16,999,244
Worth Street.....	1,779,499	1,926,826
Canal Street.....	2,612,219	2,827,652
Spring Street.....	3,352,547	3,675,544
Bleecker Street.....	3,356,993	3,654,373
Astor Place.....	5,402,944	5,690,848
Fourteenth Street.....	9,454,712	11,107,454
Eighteenth Street.....	3,542,393	3,704,045
Twenty-third Street.....	7,058,419	7,899,276
Twenty-eighth Street.....	3,444,280	3,769,036
Thirty-third Street.....	4,093,110	4,535,453
Grand Central.....	11,941,818	11,752,264
Times Square.....	8,608,030	9,638,382
Fiftieth Street.....	3,229,686	3,576,076
Columbus Circle.....	4,243,438	4,277,454
Sixty-sixth Street.....	2,514,636	2,673,627
Seventy-second Street.....	3,407,160	3,677,501
Seventy-ninth Street.....	2,265,858	2,423,332
Eighty-sixth Street.....	2,332,846	2,501,288
Ninety-first Street.....	1,287,006	1,346,103
Ninety-sixth Street.....	3,713,471	4,044,752
110th Street (Lenox).....	4,296,878	4,627,465
116th Street.....	5,632,221	5,924,344
125th Street.....	5,244,255	5,585,307
135th Street.....	4,408,123	4,807,329
145th Street.....	950,340	1,267,594
Mott Avenue.....	721,353	738,962
Third Avenue.....	3,036,056	3,406,938
Jackson Avenue.....	2,360,409	2,654,439
Prospect Street.....	3,179,832	3,765,095
Simpson Street.....	1,224,426	1,653,917
Frecman Street.....	1,804,548	2,193,048
174th Street.....	293,286	354,517
177th Street.....	957,476	1,497,982
180th Street.....	1,202,752	1,396,178
103d Street.....	2,726,233	2,887,687
Cathedral Parkway.....	1,601,654	1,964,833
Columbia University.....	1,439,839	1,731,228
Manhattan Street.....	2,462,523	2,873,651
137th Street.....	2,542,000	3,421,530
145th Street.....	2,347,753	3,031,813
157th Street.....	1,445,945	1,938,917
168th Street.....	1,071,950	1,494,188
181st Street.....	1,378,181	2,141,517
Dyckman Street.....	399,240	479,912
207th Street.....	37,991	132,955
215th Street.....	66,154	103,743
221st Street.....	45,096	.....
225th Street.....	273,388	260,834
230th and 231st Streets.....	1,716,523	1,488,329
242d Street.....	.....	925,973
Miscellaneous.....	130,352	209,638
Total.....	182,559,990	220,991,212

The ticket sales on the Second Avenue line of Manhattan (Elevated) Railway division follow:

Station.	1907.	1908.
Chatham Square.....	1,660,168	1,482,531
Canal Street.....	2,228,406	1,974,824
Grand Street.....	2,279,399	2,051,000
Rivington Street.....	2,660,926	2,614,911
First Street.....	2,866,211	2,652,301
Eighth Street.....	2,921,162	2,681,591
Fourteenth Street.....	2,156,558	1,940,901
Nineteenth Street.....	859,101	778,830
Twenty-third Street.....	1,254,269	1,173,997
Thirty-fourth Street.....	897,687	808,538

Forty-second Street.....	1,134,149	981,674
Fiftieth Street.....	852,162	775,859
Fifty-seventh Street.....	1,166,241	1,128,929
Sixty-fifth Street.....	1,339,659	1,247,039
Seventy-second Street.....	2,714,038	2,405,929
Eightieth Street.....	2,907,624	2,784,634
Eighty-Sixth Street.....	2,417,549	2,311,988
Ninety-second Street.....	1,951,802	1,825,642
Ninety-ninth Street.....	2,506,973	2,251,631
111th Street.....	2,391,783	2,142,369
117th Street.....	1,525,730	1,405,987
121st Street.....	1,551,855	1,484,822
127th Street.....	368,244	291,801
Miscellaneous.....	31,337	28,179
Total.....	42,643,933	39,286,507

The ticket sales on the Third Avenue line of the Manhattan (Elevated) Railway division follow:

Station.	1907.	1908.
Whitehall Street.....	4,124,704	3,321,929
Hanover Square.....	2,152,719	1,919,717
Fulton Street.....	1,783,662	1,691,245
Franklin Square.....	868,099	810,983
City Hall.....	12,152,355	11,233,974
Chatham Square.....	1,873,143	1,730,494
Canal Street.....	2,562,504	2,255,747
Grand Street.....	4,160,219	3,804,040
Houston Street.....	3,913,790	3,642,070
Ninth Street.....	3,920,000	3,714,332
Fourteenth Street.....	3,826,318	3,733,118
Eighteenth Street.....	2,183,316	2,182,298
Twenty-third Street.....	3,039,085	3,030,636
Twenty-eighth Street.....	1,926,136	1,772,294
Thirty-fourth Street.....	2,208,495	2,101,704
Thirty-fourth Street Ferry.....	2,186,032	1,873,549
Forty-second Street.....	2,175,872	1,948,897
Grand Central Station.....	1,069,599	1,053,875
Forty-seventh Street.....	991,892	894,945
Fifty-third Street.....	1,683,367	1,548,936
Fifty-ninth Street.....	3,278,404	3,153,228
Sixty-seventh Street.....	2,063,545	2,000,521
Seventy-sixth Street.....	2,973,360	2,758,110
Eighty-fourth Street.....	3,684,135	3,585,442
Eighty-ninth Street.....	3,118,418	2,988,983
Ninety-ninth Street.....	3,369,214	3,216,521
106th Street.....	6,187,582	5,767,378
116th Street.....	5,748,412	5,661,330
125th Street.....	4,049,002	3,746,418
129th Street.....	988,860	859,866
Willis Avenue.....	387,968	351,578
133d Street.....	2,135,940	1,955,055
138th Street.....	4,262,339	4,240,059
143d Street.....	2,467,139	2,380,708
149th Street.....	2,711,715	2,475,266
156th Street.....	2,015,074	1,922,351
161st Street.....	2,768,154	2,678,287
166th Street.....	2,422,104	2,239,658
169th Street.....	2,365,855	2,468,405
Wendover Avenue.....	2,481,957	2,516,015
174th Street.....	1,591,749	1,664,707
177th Street.....	2,974,855	2,871,441
183d Street.....	1,819,611	1,866,297
Pelham Avenue.....	1,087,192	1,068,688
Bronx Park.....	3,766,760	3,189,524
Miscellaneous.....	196,312	134,953
Total.....	129,519,023	122,085,638

The ticket sales on the Sixth Avenue line of the Manhattan (Elevated) Railway division follow:

Station.	1907.	1908.
Rector Street.....	2,592,707	2,569,088
Cortlandt Street.....	3,250,168	3,133,744
Park Place.....	2,693,764	2,327,092
Chambers Street.....	2,328,176	2,170,184
Franklin Street.....	1,410,151	1,335,489
Grand Street.....	1,799,931	1,673,916
Bleecker Street.....	2,381,687	2,197,743
Eighth Street.....	2,299,181	2,158,907
Fourteenth Street.....	3,425,356	3,361,950
Eighteenth Street.....	3,820,085	3,837,281
Twenty-third Street.....	4,557,589	4,258,157
Twenty-eighth Street.....	2,602,280	2,473,375
Thirty-third Street.....	4,867,798	4,794,106
Forty-second Street.....	3,346,135	3,473,268
Fiftieth Street.....	1,477,393	1,491,013
Fifty-third Street.....	1,191,734	1,136,914
Fifty-eighth Street.....	1,110,376	1,052,315
Fifty-ninth Street.....	1,879,903	1,803,660
Sixty-sixth Street.....	2,173,913	2,170,213
Seventy-second Street.....	1,602,394	1,614,699
Eighty-first Street.....	2,753,769	2,723,374
Ninety-third Street.....	3,163,914	3,065,977
104th Street.....	4,036,744	3,868,258
110th Street.....	1,929,728	2,108,715
116th Street.....	4,007,042	3,784,656
125th Street.....	4,221,279	4,276,256
130th Street.....	1,860,054	1,879,627
135th Street.....	3,235,857	2,781,215
140th Street.....	2,408,488	2,441,464
145th Street.....	2,600,742	2,817,360
155th Street.....	3,362,035	3,564,508
Miscellaneous.....	843,572	599,741
Total.....	85,234,445	82,945,171

The ticket sales on the Ninth Avenue line of the Manhattan (Elevated) Railway division follow:

Station.	1907.	1908.
South Ferry.....	2,057,382	1,660,075
Battery Place.....	1,558,446	1,543,832
Rector Street.....	770,227	576,353
Cortlandt Street.....	3,492,805	3,319,303
Barclay Street.....	1,548,051	1,483,598
Warren Street.....	2,610,659	2,374,050
Franklin Street.....	1,290,518	1,224,367
Desbrosses Street.....	1,508,838	1,359,458
Houston Street.....	1,108,857	999,834
Christopher Street.....	2,684,858	2,483,842

Fourteenth Street.....	2,235,647	2,916,710
Twenty-third Street.....	2,917,988	2,616,812
Thirtieth Street.....	1,143,920	1,028,504
Thirty-fourth Street.....	1,821,373	1,641,530
Forty-second Street.....	2,639,307	2,469,797
Fiftieth Street.....	2,030,473	1,830,545
Fifty-ninth Street.....	965,500	892,640
Miscellaneous	18,166	19,570
Total	32,493,075	29,537,820

Through Service Between New York and Yonkers

An agreement has been reached between the Westchester Electric Railroad and Frederick W. Whitridge, receiver of the Third Avenue Railroad and the Union Railway, New York, by which cars of the Westchester Electric Railroad will be operated over the lines of the Union Railway and the Third Avenue Railroad to a connection with the New York subway at 177th Street for 10 cents. The official notice to passengers of the Westchester Electric Railway regarding the new service, which went into effect on June 8, says:

"On and after June 8, 1909, and until further notice, the cars of the Westchester Electric Railroad will be operated from Larchmont to 177th Street, New York, at the subway. The fare on this line will be 10 cents. The second fare will be collected at 233d Street, from both north- and south-bound passengers. No transfers will be issued or received on this line in Mt. Vernon. Cars will also be operated from Mt. Vernon to Bedford Park, upon which a fare of 5 cents will be charged. Transfers will be issued from this line to all Mt. Vernon short lines of this company and will also be received on this line from such short lines. Transfers from the cars of the Westchester Electric Railroad to the cars of the Yonkers Railroad in Mt. Vernon will not be issued except on payment of cash fare upon the Harlem Station line. Transfers will not be accepted from the Yonkers Railroad cars in Mt. Vernon except on the Harlem Station line."

Reduction of Fare and Continuance of Schedule Ordered in Massachusetts

The Railroad Commission of Massachusetts has issued the following finding in the case of the petition of the Selectmen of Westford relative to an increase in fare and the discontinuance of service on the Lowell & Fitchburg Street Railway in Westford:

"On May 17, 1909, the Lowell & Fitchburg Street Railway increased the fare on what is known as the 'Branch,' from Westford Center and Brookside, to 15 cents. The fare so charged is entirely for transportation within Westford, and this, together with a 5-cent fare on other portions of the company's line, results in a maximum fare of 20 cents for a ride in Westford.

"The fare complained of is, in the opinion of the board, unreasonable and excessive. As was said May 9, 1908, in the Montague case: 'We are confirmed in this decision by our inability to find anything in the way of comparative rates for like service under like conditions upon this road or elsewhere in Massachusetts to justify the company in charging 15 cents for a ride over a part only of its system in the township, thus creating a 20-cent fare within the town limits.' We, therefore, recommend a reduction. In view, however, of the income from operation over that portion of the line upon which the fares have been raised, we are unable to recommend any increase in service."

Pennsylvania Road Begins Freight Service.—The Easton & Bethlehem Transit Company is operating a freight service between Easton, Bethlehem, Nazareth, South Bethlehem and Freemansburg.

To Suppress Disorder on Louisville Cars.—So many complaints have been made to the Police Department of Louisville, Ky., about disorder on street cars and interruption to traffic on account of the hoodlum element, that the chief of police has issued a general order quoting the statutes in regard to profane language and quarreling on street cars and refusal to pay fares, and has ordered the police to enforce the law strictly.

Prizes for Trademark.—The Toledo Railways & Light Company, Toledo, Ohio, has offered a series of cash prizes for a trademark that may be used to make the company's stationery and literature distinctive. For the best design, \$100 will be paid; for the second best, \$50; for the third best, \$35, and for the fourth best, \$15. Competitors must be residents of Toledo and must have their designs filed with the company by 6 p. m. on July 31, 1909.

No Transfer on a Transfer in Seattle.—The Seattle (Wash.) Electric Company recently issued a general order to conductors not to issue transfers on transfers on any

line except the James Street cable road between First Avenue and Broadway. The abuse of the transfer privilege is given as the reason for the order. A protest lodged with the company by A. V. Bouillon has resulted in the rescinding of the order, pending a settlement that shall not work quite so seriously to the inconvenience of the public as did the original order. The company, however, is determined to put a stop to the organized efforts made to defraud the company by manipulating transfers.

Evansville Strike Broken.—On page 1003 of the ELECTRIC RAILWAY JOURNAL of May 29, 1909, and on page 1060 of the ELECTRIC RAILWAY JOURNAL of June 5, 1909, mention was made of the request of the employees of the Evansville & Southern Indiana Traction Company, Evansville, Ind., for a readjustment of the terms of service with the company and of the attitude of the company in the matter. The company refused flatly to accede to the demands for recognition of the union and an increase in wages, and as a consequence about 125 employees did not take out their cars on May 29. The company was prepared for this emergency and filled the places of the strikers at once. Attacks were made on cars in various parts of the city by sympathizers with the strikers, but no serious damage was done to the company's property. Realizing that they had been misled, about 30 strikers applied for reinstatement on June 5, and on June 6 the company re-employed 23 of these men. Conditions are now practically normal.

Strike on Pittsfield Electric Street Railway.—The employees of the Pittsfield Electric Street Railway went on strike on June 3, but were only out one day. The company had an agreement with the employees which expired on June 4. On June 1 a committee of the men called upon the company and were received by F. J. Dolan, acting manager, who told the men that the requests which they made would have to be considered by P. C. Dolan, president of the company, and P. H. Dolan, superintendent, both of whom were then absent. The men desired a graduated wage scale, ranging from 21 cents an hour for first-year men to 25 cents an hour for fifth-year men and recognition of the union. The men voted to strike, with the result that the system was tied up on June 2. Negotiations were resumed, however, and a settlement was reached on June 3, according to which the company will grant the request of the men for an increase in wages but will not recognize the union, treating in the future with a committee of the employees as employees.

New York Commission Grants Permission for Abandonment of Part of Route.—The Public Service Commission of the Second District of New York has given the Bennington & North Adams Street Railway, Hoosic Falls, N. Y., permission to abandon a portion of its route in Hoosic Falls, beginning at the intersection of the easterly line of the right of way of the Boston & Maine Railroad with River Street, running thence westerly on River Street to Third Street, thence northerly on Third Street to Elm Street, thence easterly on Elm Street to the Boston & Maine Railroad, on condition that the company make the terminus of its line in Hoosic Falls at the intersection of the easterly line of the Boston & Maine Railroad's right of way with River Street and furnish such facilities as have been customary at the present terminus of its line for the convenience of passengers boarding and alighting from its cars at such terminus. It was shown, the commission says, that the line did not pay operating expenses and that no controlling reasons appeared to warrant continuance of operation.

Settlement of Wage Question in Winnipeg.—Early in the year a committee of the conductors and motormen employed by the Winnipeg (Man.) Electric Company waited on officials of the company and asked for a readjustment of wages and the conditions governing service with the company. As it was impossible to reach an agreement, a board of arbitration was appointed as provided for under the Lemieux act. W. J. Christie was selected to represent the company and J. G. O'Donohue was selected to represent the employees. The Government then appointed the Rev. C. W. Gordon (Ralph Connor, the author) as chairman. The board began holding sessions on May 11 and concluded them on May 31, having reached an agreement. This agreement was accepted by the men on June 2. The men desired a 9-hour day instead of a 10-hour day, with pay for 10 hours. The board recommended the following schedule of wages: 21 cents for first six months, as compared with 21 cents formerly; 23 cents for second six months, as compared with 22 cents formerly; 24 cents second year, as compared with 23 cents formerly; 26½ cents for third year, as compared with 23 cents formerly; 27 cents for fourth year, as compared with 23 cents formerly; 27 cents for fifth year and thereafter, as compared with 26 cents formerly. Senior men will be permitted to select routes, subject to a rating for efficiency.

Personal Mention

Mr. Gardner Rogers has been appointed manager of the Houghton County Traction Company and the Houghton County Electric Company, Houghton, Mich. Mr. Rogers was formerly general superintendent of the Minneapolis (Minn.) General Electric Company.

Mr. A. R. Koonce has been appointed master mechanic of the Little Rock Railway & Electric Company, Little Rock, Ark., to succeed Mr. W. J. Tunnah, who has been appointed master mechanic of the Birmingham Railway, Light & Power Company, Birmingham, Ala.

Mr. M. C. Carpender has been appointed general manager of the Plattsburgh (N. Y.) Traction Company to succeed Mr. A. E. Reynolds, resigned, who, as noted in the *ELECTRIC RAILWAY JOURNAL* of June 5, 1909, has been appointed general manager of the Hudson Valley Railway, with offices at Glens Falls, N. Y.

Mr. E. T. Steel, who has been purchasing agent of the Savannah (Ga.) Electric Company since January, 1908, has been appointed general manager of the Ponce Railway & Light Company, Ponce, Porto Rico. Mr. Steel was connected with the Ponce Railway & Light Company before becoming connected with the Savannah Electric Company.

Mr. Oliver T. Boyd has been appointed general passenger agent of the Hudson & Manhattan Railroad, New York, N. Y. Mr. Boyd is 30 years old, and has been connected with the Pennsylvania Railroad for 12 years in various capacities in its passenger department. For the last three years he has been city passenger agent of the Pennsylvania Railroad in Washington, D. C.

Mr. J. Harry Dufresne has been appointed assistant treasurer of the Northern Texas Traction Company, Fort Worth, Tex. Mr. Dufresne was formerly assistant treasurer of the Houghton County Traction Company and the Houghton County Electric Light Company, Houghton, Mich., and has been connected with properties managed by Stone & Webster for some time.

Mr. G. G. Gale has been appointed general superintendent of the Hull Electric Company, Deschenes, Que. Mr. Gale entered the employ of the Hull Electric Company in January, 1907, as superintendent of power. In November, 1908, he was appointed acting general superintendent of the company, in control of operation, accounting and construction. This appointment was recently confirmed.

Mr. J. G. Holtzclaw has been appointed purchasing agent of the Savannah (Ga.) Electric Company, to succeed Mr. E. T. Steel, who has accepted the position of manager of the Ponce Railway & Light Company, Ponce, Porto Rico. Mr. Holtzclaw entered the employ of the Savannah Electric Company in January, 1908, as a student from the Boston office of Stone & Webster, and has been connected with various operating departments of the company since that time.

Mr. John F. Stevens has resigned as vice-president of the New York, New Haven & Hartford Railroad, New Haven, Conn., in charge of operation, to become connected with the Great Northern Railroad, St. Paul, Minn. According to L. W. Hill, president of the Great Northern Railroad, Mr. Stevens has been engaged to inspect and report on the company's water powers in Montana and Washington and to consider other engineering questions which are under consideration.

Col. E. C. Spring, general superintendent of the Dayton, Covington & Piqua Traction Company, Dayton, Ohio, has tendered his resignation to take effect on Sept. 1, 1909. Col. Spring will thereafter represent a syndicate of Dayton capitalists as operating manager of electric railway, electric light and water properties now operating and to be built in Lawrence and Parsons, Kan. Mr. Thomas J. Brennan, who has been assistant superintendent of the Dayton, Covington & Piqua Traction Company, will, on Sept. 1, assume the title of general superintendent of the company.

Mr. Clarence Wolf has resigned as a representative of the City of Philadelphia on the board of directors of the Philadelphia Rapid Transit Company and has been elected first vice-president of the company to succeed Mr. George D. Widener, resigned, who continues as a director of the company. Mr. Wolf succeeds Mr. George H. Earle, president of the Real Estate Trust Company, as a director of the Philadelphia Rapid Transit Company. Mr. Wolf is a State Senator. He has important banking and commercial interests in Philadelphia, and has been active in regular Republican politics for some years.

Mr. J. R. Bibbins, who since 1902 has been associated with the Westinghouse interests at Pittsburgh, Pa., recently serving the Westinghouse Machine Company as commer-

cial engineer, after June 18 will become associated in the work of the Public Service Commission of New York as assistant to Mr. B. J. Arnold, consulting engineer and director of appraisals. Mr. Bibbins is a graduate of the University of Michigan, and has served in various technical capacities with the Detroit Public Lighting Commission, the Detroit Edison Company and the Detroit United Railways Company, in operating and construction work. During his late connection with the Westinghouse Machine Company, Mr. Bibbins' work has included an intimate association with the development of prime movers in East Pittsburgh, including gas engines, producers, turbines and condensers. His new offices will be in the Tribune Building, City Hall Square, New York.

Mr. William Wallace has been appointed chief city street car inspector of Cincinnati, Ohio, by the Board of Public Service, to inspect the equipment of street cars operated in Cincinnati in the interest of the city. Mr. Wallace will be assisted by six inspectors and five subordinate inspectors. Mr. Wallace has been connected with the street railways in Cincinnati for more than 20 years. He began his railway career in December, 1885, as a driver, and in 1891, when the Cincinnati Street Railway placed its first line in operation, he entered the employ of the company as a motorman. In January, 1895, he succeeded Mr. William Crowley as superintendent of the Eighth Street division of the company, and remained in this capacity 10 years, finally resigning on account of ill health. After an extended vacation in the country Mr. Wallace returned to Cincinnati and entered the service of the city, for which he served recently as assistant member of the Board of Public Service. Mr. Wallace will have as assistant car inspectors Mr. William Hoyser, Mr. James Duncan, Mr. John Halpin, Mr. James Powers and Mr. Nicholas Weber, all of whom have had extended experience in street railway work.

Mr. H. C. Hoagland, whose resignation as chief electrical and mechanical engineer of the Illinois Traction System, Decatur, Ill., to become vice-president and general manager of the Missouri Central Railway, Columbia, Mo., was noted in the *ELECTRIC RAILWAY JOURNAL* of June 5, 1909, page 1061, was born in Covington, Pa., on April 17, 1865, and moved with his parents to Elmira, N. Y., when about five years old. Mr. Hoagland was educated at the public schools in Elmira and at Warner's College, Elmira, from which institution he was graduated in the spring of 1882. On Sept. 25, 1882, he became connected with Mr. A. S. Turner, who installed the first electric light plant in Elmira, which later became part of the holdings of the Elmira Water, Light & Railway Company. In 1886 Mr. Hoagland entered the employ of the Thomson-Houston Company and installed apparatus at Elmira, Fulton, Phoenix, Syracuse and other places in New York State, and after installing the property at Oneida, N. Y., remained there for six years as superintendent. On Feb. 1, 1893, Mr. Hoagland went to Kalispell, Mont., where he rebuilt the water works and electric light plant, and in 1894 he was employed by the White-Crosby Company on the construction of the Buffalo-Niagara Falls Electric Railway. On the completion of this road, Mr. Hoagland became superintendent and electrician of the municipal light plant at Kalamazoo, Mich., resigning after a year's service to become general superintendent of the Kalamazoo Electric Company, which was soon absorbed by the W. A. Foote interests and succeeded by the Kalamazoo Valley Electric Company, which has since become the Commonwealth Power Company, by which Mr. Hoagland was employed eight years as general superintendent. During Mr. Hoagland's connection with this company the water power plants at Trowbridge, Pine Creek and Plainwell, and the 41,000-volt transmission line from Trowbridge to Jackson were built. On March 1, 1904, Mr. Hoagland accepted the position of general superintendent of the Danville, Urbana & Champaign Railway and the street railway, gas, electric light and steam-heating systems at Danville, Ill., and on Jan. 1, 1905, was appointed electrical and mechanical engineer of the Illinois Traction System. Mr. Hoagland will retire from the Illinois Traction System on July 1, about which time active construction will be begun on 60 miles of line for the Missouri Central Railroad, of which he will be vice-president and manager.

OBITUARY

William B. Clements, treasurer of the Peekskill Lighting & Railroad Company, Peekskill, N. Y., and the Northern Westchester Lighting Company, Ossining, N. Y., is dead. Mr. Clements was born near Fredericton, N. B., 38 years ago.

John J. Horgan, superintendent of the Cambridge division of the Boston (Mass.) Elevated Railway, died at his home in Cambridge on May 28. Mr. Horgan was born in Lexington, Mass., and had been connected with the Boston Elevated Railway 35 years.

Construction News

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

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

RECENT INCORPORATIONS

***Oil Belt Traction Company, Oblong, Ill.**—Incorporated to build a railway from Charleston to Bridgeport. Capital stock, \$100,000. Incorporators: G. E. Groves, D. W. Odell, D. J. Odell, Geo. P. Murrin and F. P. Willard, Oblong.

***New Bern Power Company, New Bern, N. C.**—Incorporated to build a street railway in New Bern. Capital stock, \$500,000. Incorporators: R. P. Foster, J. W. Stewart, R. A. Nunn and M. D. Lane.

Okmulgee Interurban Company, Guthrie, Okla.—Chartered to build an electric railway from Okmulgee to an amusement park, 8 miles. Capital stock, \$200,000. Incorporators: J. B. Jones, Muskogee; A. M. Gammon, Chelsea; J. M. Sims, W. D. Todd, and O. A. Lambert, Okmulgee. [E. R. J., June 5, '09.]

Johnstown & Gallitzin Railway, Johnstown, Pa.—Application will be made on June 18 by this company for a charter to build an electric railway between Johnstown and Gallitzin. Applicants for the charter are: Wallace Sherbine, Thos. J. Pearce, Alvin Sherbine and H. W. Storey. [E. R. J., Feb. 6, '09.]

FRANCHISES

***Edmonton, Alta.**—A syndicate of French capitalists, represented by Messrs. Short, Cross & Biggar, Edmonton, are reported as seeking franchises to build a number of radial railways from Edmonton, Alta. At a meeting of the City Council the Aldermen were strongly in favor of granting the syndicate the privileges asked and it is expected active construction will be started this year. The syndicate has plans for constructing 160 miles of track at the start.

Los Angeles, Cal.—Application for a franchise to build an electric railway on East Seventh Street from the city limits of Long Beach to the easterly line of Redondo Avenue has been made to the Board of Supervisors by the Pacific Electric Railway.

Sacramento, Cal.—The Board of Supervisors has granted to the Central California Traction Company a franchise to construct an electric railway on Magnolia Avenue in Oak Park. [E. R. J., May 1, '09.]

New London, Conn.—The Senate has granted to the New London & East Lyme Street Railway an extension of its franchise, to Nov. 1, 1910, for extending its lines to the Connecticut River. The bill will next go to the House for consideration. [E. R. J., Feb. 6, '09.]

Elgin, Ill.—Application has been made to the City Council by the Aurora, Elgin & Chicago Railroad through its president, J. Wolf, for a franchise to extend its lines over Park Street.

Kankakee, Ill.—The Chicago, Kankakee & Champaign Electric Railroad has applied to the City Council for a 50-year franchise to build an electric railway on River Street and Schuyler Avenue. [E. R. J., May 29, '09.]

New Orleans, La.—An ordinance has been introduced in the City Council for the sale of a franchise for the operation of a street railway from Galvez Street along Franklin Avenue to St. James Avenue. The franchise is to be sold by the Comptroller at public auction in block, the bidder offering to pay no less than one-half of 1 per cent of the gross annual income, less taxes, to be awarded the franchise for a period of 39 years, June 30, 1912.

Moberly, Mo.—The City Council has granted to Manning, Wellman & Company a franchise to build an electric railway between Moberly and Huntsville. [E. R. J., April 24, '09.]

Springfield, Mo.—The Springfield Traction Company has asked the City Council for a 20-year extension of its franchise. The company is to build a line on Nichols Street and Atlantic Street to the new Frisco shops. [E. R. J., March 13, '09.]

New York, N. Y.—The Board of Estimate and Apportionment has granted a franchise to the Hudson & Manhattan Railroad to extend its tunnel from Sixth Avenue and Thirty-third Street to the Grand Central Station in Manhattan.

Columbus, Ohio.—The City Council has granted to the Ohio Electric Railway a 25-year blanket franchise over city streets to secure a new \$175,000 union interurban station at South Third Street and Rich Street and also established a new electric light rate of 7 cents net for a 5-year period. The franchise measure permits the laying of T-rails and the abandonment of the loop in Columbus.

***Chickasha, Okla.**—The City Council has granted to Lawrence Martin a franchise to build a street railway. The franchise runs for 25 years and provides that the railway must be in operation within one year from the time construction is begun. An election will be held at which the question will be submitted to the people.

Astoria, Ore.—The United Public Service Company, Philadelphia, has paid the treasurer of Astoria \$1,000, the amount provided in the ordinance granting a franchise to the Oregon Seacoast Railway, as a deposit and guarantee of good faith in constructing an electric railway between Astoria, Seaside and Tillamook. Under the conditions of the franchise work must be commenced on or before Aug. 7, 1909, and the line completed from the corner of Twelfth Street and Duane Street, Astoria, to a connection with the north approach of the Young's Bay bridge, and completed to Seaside within two years from March 7, 1909. [E. R. J., March 30, '09.]

Portland, Ore.—Dr. Henry Waldo Coe, president of the St. Helens Public Service Company, has applied to the City Council for a franchise to enter the city of Portland by the way of Tenth Street east and west. This company has already secured franchises in all towns on the main route. [E. R. J., Oct. 20, '06.]

Portland, Ore.—Mayor Lane has vetoed the ordinance, passed by the City Council at its last session, granting to the United Railways one year's extension of time for completing its track to Mount Calvary Cemetery and Hillsboro. [E. R. J., June 5, '09.]

Watertown, S. D.—Application has been made to the City Council by A. L. Rowe for an extension of his franchise to build an electric railway to Lake Kampeska. [E. R. J., May 29, '09.]

TRACK AND ROADWAY

Phoenix (Ariz.) Railway.—This company contemplates extending its Indian School line for a distance of about 2¼ miles.

Pacific Electric Railway, Pomona, Cal.—It is announced that this company will build a 1½-mile extension to its railway in Pomona preparatory to placing it in operation.

***Del Monte Townsite Company, Del Monte, Cal.**—This company is said to have made surveys and secured capital for the construction of a 3-mile electric railway from Monterey to Del Monte Heights. Contracts for construction of the line will be let soon. F. M. Fairchild, Oakland, Cal., chief engineer; Geo. W. Phelps, San Francisco, Cal., president.

Denver, Colorado Springs & Pueblo Interurban Electric Railroad, Denver, Col.—The promoters of this proposed electric railway which is to connect the cities named in the title announce that they have decided to let the matter drop for the present, at least. [E. R. J., May 22, '09.]

Twin Falls, Idaho.—George D. Aiken, Twin Falls, writes that the franchise which recently was granted to him was for a short extension of the present track operated for warehouse purposes only and installed about one year ago. Rails and ties for this extension were purchased from the Short Line Railroad. [E. R. J., May 15, '09.]

Climbing Hill, Ia.—The ELECTRIC RAILWAY JOURNAL is advised that the examination of the route for the proposed electric railway which is to connect Sioux City, Climbing Hill and Ida Grove, is practically completed, and R. H. Baldwin, Chicago, Ill., who has charge of the preliminary work for the temporary organization is now preparing the report. If the report warrants it, a permanent company, to be known as the Sioux City & Eastern Traction Company, will be organized and surveys begun immediately. This project has no connection with any other railway project now under way in this section of Iowa. The headquarters for the present will be at Climbing Hill. [E. R. J., May 29, '09.]

Arkansas Valley Interurban Railway, Wichita, Kan.—It is stated that the plan of building an electric railway from Wichita to Hutchinson, 50 miles, and thence to Newton by way of Burrton, and from Newton to Wichita by way of Valley Center and Sedgwick, has been revived. A company has been organized and stock to the amount of \$100,000 has been subscribed by Wichita business men. Among those interested in this project are: W. O. Van Arsdale, C. H. Smythe, E. T. Battin, R. L. Holmes, O. A. Boyle, James Allison, James L. Tuttle, Geuda Springs, A. H. Barnes, Oxford.

***Absarokee, Mont.**—G. M. Hawkins, Absarokee, advises that he is interested in a project to build a 12-mile electric railway in the vicinity of Absarokee. Mr. Hawkins states that the land is very rich and productive, the market good at the Northern Pacific Railroad and there is an easy grade, no bridges will be necessary and abundant water power.

***Springdale, Mont.**—It is stated that James A. Murray, Butte, is considering a plan to build an electric railway from Springdale to Hunter's Hot Springs, 2½ miles.

***Kansas City, Mo.**—It is announced that the Townsend-Enright Syndicate will build a double-track railroad to be operated by both steam and electricity between Kansas City and St. Joseph, Mo., 52 miles. Construction is reported begun 6 miles from Dearborn. George Townsend, Kansas City, and Chas. F. Enright, St. Joseph, Mo., are said to be interested. A branch to Cameron, Mo., is proposed. The Kansas City Junction Railway, the Jackson County Railway, the Missouri River & Cameron Railway, and the Lewis Bridge Company will, it is reported, be consolidated as the Kansas City & St. Joseph Terminal & Railway Company. Two bridges will be built, one costing \$500,000 over the Kaw River and another \$1,500,000 over the Missouri River. A terminal on the river front, estimated to cost about \$2,000,000 with a large depot, is in the plan.

Mountain Railway, West Orange, N. J.—This company advises that it will build a ½-mile extension to Essex County Park, contracts for which will be placed during the next six weeks.

Third Avenue Bridge Company, New York, N. Y.—Frederick W. Whitridge, receiver of the Third Avenue Railroad, has announced that this company has been incorporated for the purpose of operating shuttle cars over the Queensboro Bridge, transferring to and from all lines of the Third Avenue Railroad. [E. R. J., June 5, '09.]

Geneva & Auburn Railway, Seneca Falls, N. Y.—The State Land Board has granted perpetual easements to lands under the waters of Cayuga Lake to the Geneva, Waterloo, Seneca Falls & Cayuga Lake Traction Company, so as to permit the erection of a bridge a mile long. The company was recently given authority by the Public Service Commission, Second District, to construct an extension of its railway from Seneca Falls to Auburn, crossing Cayuga Lake. [E. R. J., June 5, '09.]

Watertown & Carthage Traction Company, Watertown, N. Y.—Governor Hughes has signed the bill permitting the construction of this 20-mile electric railway between Watertown and Carthage by extending the franchise secured some years ago. John N. Carlisle, Watertown, president.

Cincinnati, Lawrenceburg & Aurora Electric Street Railroad, Cincinnati, Ohio.—As the result of a mass meeting held June 1, preparation is being made to hold an election to vote a 2 per cent subsidy tax to this company to build an extension from Aurora to Madison, thence to Scottsburg, connecting with the line of the Indianapolis & Louisville Traction Company. The company proposes to operate a through freight service from Cincinnati to Louisville. [E. R. J., June 5, '09.]

Columbus, New Albany & Johnstown Traction Company, Columbus, Ohio.—This company has awarded a contract for the extension of its line from the present terminus at Gahanna to Johnstown, a distance of 14 miles, to the Dominion Construction Company, Pittsburgh. The company has also appropriated \$650,000 to cover the cost of construction. Engineers are already on the ground and a number of routes have been surveyed. The most favorable route will entail considerable grading and the construction of several bridges.

Toledo, Bowling Green & Southern Railway, Findlay, Ohio.—At a conference held recently, a plan was considered for extending the Toledo, Bowling Green & Southern Railway through to Columbus by way of Kenton and Marysville. This plan would include lifting the receivership of the Toledo Urban & Interurban Railway. The bondholders are said to be willing to take over this property and merge it with the Toledo, Bowling Green & Southern Railway.

Lake Erie & Youngstown Railway, Youngstown, Ohio.—It is announced that this company plans to begin, within 30 days, the construction of its proposed electric railway to extend from Conneaut through Andover and other points to Youngstown. The contract has been awarded to the Stanley Construction Company, Conneaut, and the cost of the building and the equipment will be, it is estimated, \$3,000,000. The new line will connect with the Youngstown & Southern Railway, which extends from Youngstown to East Liverpool.

Ardmore, Okla.—Oscar Ayers, who recently submitted a proposition to Ardmore for the construction of an inter-urban electric railway from Ardmore to Chickasha, which was accepted, is quoted as saying that the work of making a preliminary survey for the route will begin at once. Ardmore's offer is a bonus of \$50,000 and right-of-way from Ardmore to Springer, 12 miles northwest. [E. R. J., May 29, '09.]

Oklahoma Midland Electric Railway, Hobart, Okla.—This company has awarded to the J. A. Kauffman Company,

La Fayette, Ga., the contract for building the proposed electric railway which is to extend from Sayre to Oklahoma City via Hobart, a distance of 150 miles. The contract also covers the construction of two 8,000-hp water power stations. Surveyors were placed in the field on June 7 to make the preliminary surveys. [E. R. J., April 17, '09.]

Niagara, St. Catharines & Toronto Railway, St. Catharines, Ont.—It is stated that this company has agreed to extend its railway from Welland to Port Colborne provided satisfactory terms can be made with Port Colborne. It is said that eventually the line will be extended east along the shore of Lake Erie from Port Colborne to Buffalo.

Dunnville, Wellandport & Beamsville Electric Railway, Wellandport, Ont.—H. Lloyd, Dunnville, has been awarded the contract for the construction of the first 10 miles of the Dunnville, Wellandport & Beamsville Electric Railway. The proposed railway will connect the cities named in the title and will be about 23 miles in length. James A. Ross, Wellandport, president. [E. R. J., May 8, '09.]

Montreal, Que.—It is stated that the Dominion Government is considering the electrification of the Intercolonial Railway from Montreal to Moncton, N. B. The water power at Grand Rapids will be developed to furnish electricity to operate the railway if the plan is carried through.

***Greenville, S. C.**—It is reported that Clemson College will build an electric railway to connect with Calhoun, and will eventually extend it to Cherry Station, on the Blue Ridge Railroad.

Nashville Railway & Light Company, Nashville, Tenn.—This company has filed an application to amend its charter so as to permit it to make a number of extensions and improvements in and around Nashville. It is proposed to construct lines to connect Goodlettsville, Nolensville, Paradise Ridge, Una, Belle Meade, Old Soldiers' Home, Masonic Widows and Orphans' Home, Franklin, Bordeaux and other places. Percy Warner, president of the company, is quoted as saying that it is not intended to immediately build these extensions, but it is desired to give the company authority to make them as circumstances may demand. Altogether about 18 pieces of track may be constructed under the amendment.

***Beaumont, Tex.**—Col. I. D. Polk, Beaumont, is quoted as saying that financing has been arranged to build the proposed electric railway from the Beaumont Country Club via Beaumont and Spindle Top to Port Arthur and the docks. No announcement has been made as yet as to when construction will begin.

***Houston, Tex.**—The South End Land Company, according to a press report, contemplates building a street railway from its property near Rice Station to connect with Houston.

Central Texas Development Company, Temple, Tex.—This company has been organized to make preliminary surveys, secure rights-of-way and franchises for the proposed electric railway between Temple and Waco. Chas. M. Campbell is chairman; G. E. Wilcox, Temple, president; W. J. Neale, Waco, vice-president; W. L. Prather, Waco, secretary; P. L. Downs, Temple, treasurer. [E. R. J., May 22, '09.]

Spokane & Inland Empire Railroad, Spokane, Wash.—It is announced that this company is considering plans for a branch line 20 miles long into the Coeur d'Alene Indian reservation, which is to be opened in August. The proposed electric railway would leave the main line near Ochlare, Wash., and run to Plummer, Idaho.

Tacoma-Seattle Short Line Electric Railway, Tacoma, Wash.—At a stockholders' meeting recently held in Tacoma, this company was reorganized, the controlling interest going to E. J. Felt and H. A. Eastman, who signed a contract to finance, build and equip the railway ready for operation. The line will be double-tracked and will connect Tacoma and Seattle, a distance of about 30 miles. The following officers and directors were elected: James B. Murphy, Seattle, president; Henry Ewing, vice-president; Arthur G. Prichard, Tacoma, treasurer; Alfred E. Rothermel, Tacoma, secretary. These, with L. P. Hornberger, Seattle, and C. L. Hoska, Tacoma, constitute the board of directors. The capital stock of the company, originally placed at \$6,000,000, has been reduced to \$4,000,000 by the setting aside of \$2,000,000 out of the six as treasury stock which is to be used only in building extensions and not in the main line between the two cities. A bond issue of \$3,500,000 of 6 per cent 20-year bonds was authorized, which will be taken over by the Eastman syndicate. [E. R. J., Nov. 14, '08.]

Sparta-Melrose Electric Railway, Sparta, Wis.—This company has awarded a contract to G. W. Orton and W. G. Horn, of New Lisbon, for the grading of 5 miles of track. [E. R. J., May 29, '09.]

SHOPS AND BUILDINGS.

Los Angeles-Pacific Company, Los Angeles, Cal.—This company proposes to build a new passenger station at Trolleyway and Pier Avenue, Ocean Park. It is estimated that the depot and store rooms in connection with it will cost \$11,000.

Denver (Col.) City Tramway.—This company is said to have completed plans whereby it will erect a seven-story modern office building of concrete construction to cost, it is estimated, \$500,000 on the northwest corner of Fourteenth Street and Araphoe Street, which will contain the headquarters of the company. [E. R. J., March 27, '09.]

Inter-Mountain Railway, Denver, Col.—This company will erect a six-story building and depot at Fourteenth Street and Curtis Street, Denver.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—This company advises that it will build a ticket office and freight house at Elkhart and Mishawaka. A new freight station and a car house will be erected by the company at South Bend.

Maryland Electric Railways, Baltimore, Md.—Announcement is made that this company will erect a new park terminal on its property bounded by Druid Hill and Fulton Avenue and Francis Street. Plans and specifications for the building have been prepared by Messrs. Baldwin & Pennington, architects. The car house will be leased to the United Railways & Electric Company. The building will be 191 ft. x 472 ft. in size, two stories high and will not only have storage room for cars but a large open concourse near the front of the building to accommodate the cars waiting for passengers. It will be constructed of reinforced concrete throughout, with exterior walls of vitrified brick and terra-cotta cornice and trimmings. On the second floor will be a large lecture room to accommodate 600 men with a platform at one end; an instruction room, 45 ft. x 80 ft.; a reading room, 64 ft. long; locker rooms, superintendents' rooms, clerks' rooms, waiting rooms and washrooms. Bids for the work will be opened on June 14. The car house is planned to provide accommodations for five lines—the Druid Hill Avenue, Linden Avenue, Gilmor Street, Carey Street and Preston Street.

Mexican Electric Tramway, Mexico, Mex.—This company has placed an order with the United States Steel Products Export Company for several hundred tons of structural steel for the erection of car houses at Indianilla. The contract for the construction of the structure has been let. The car houses will cover nearly two blocks in length.

Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y.—This company has awarded to Edward K. Fenno, Auburn, the general contract for the erection of new repair shops which are to be built south of the present car houses of this railway. The building, which will be 132 ft. x 240 ft. in size, will be fireproof, and will be built of brick and steel construction. The steel will be furnished by the Archbold-Brady Company, Syracuse. The plans and specifications for the structure were prepared by Sheaff & Jaastad, Boston, Mass.

Portland Railway, Light & Power Company, Portland, Ore.—It is stated that work will soon be started by this company on the first of its car houses which when completed will accommodate 200 cars and will represent a total outlay of close to \$100,000, including tracks, yards, etc. The ground space covered by the building will be about 250 ft. x 450 ft. It is announced that the company will build in such a way that it can add more space and trackage whenever the needs require. The first section of the car houses which will be built during this season will represent an outlay of about \$30,000, and it will have a capacity of about 70 cars. It is the intention to increase the size of the buildings until the available ground space of 250 ft. x 450 ft. has been covered.

POWER HOUSES AND SUBSTATIONS

Illinois Traction System, Champaign, Ill.—The engineering department of this company is now at work on plans for a new power plant to be built at East St. Louis on the lower side of the new Mississippi River bridge now in course of construction. This plant, which will be the largest on the system, is designed to supply all the lines with current south of Springfield. At present the Riverton plant, near Springfield, is furnishing the southern end of the system, but has been found inadequate. The new plant is to have a 10,000-hp capacity, which can be doubled. It is said that plans will also be drawn for the new St. Louis station as soon as the site has been selected.

Oklahoma Midland Electric Railway, Hobart, Okla.—This company has awarded a contract to the J. A. Kauffman Company for the construction of two 8000-hp water power plants. [E. R. J., April 17, '09.]

Manufactures & Supplies

ROLLING STOCK

Patten Manufacturing Company, Chattanooga, Tenn., is asking prices on dump cars.

United Railways & Electric Company, Baltimore, Md., may purchase some motor cars, though the number cannot be learned.

Ithaca (N. Y.) Street Railway has purchased two 20-ft. closed cars fully equipped from MacGovern, Archer & Company, New York.

Rockland, South Thomaston & Owl's Head Railway, Rockland, Maine, has purchased three cars from Wason Manufacturing Company, it is reported.

Winona Railway & Light Company, Winona, Minn., has purchased four more 8-bench open trail cars from the Dorner Railway Equipment Company, Chicago.

Twin City General Electric Company, Ironwood, Mich., has purchased two 10-bench open cars with Brill 21-E trucks from the Dorner Railway Equipment Company, Chicago.

Walkkill Transit Company, Middletown, N. Y., has purchased two Brill Narragansett 15-bench open cars, two Jackson-Sharp 10-bench open cars and two work cars from John B. Watson, Philadelphia, Pa.

Nebraska Traction & Power Company, Omaha, Neb., has purchased two 21-ft. motor cars, mounted on Brill 21-E trucks and equipped with two GE-800 motors, from the Dorner Railway Equipment Company.

Slate Belt Electric Street Railway, Pen Argyl, Pa., is having five of its cars repainted and overhauled by J. S. Mettler, of Pen Argyl, and will not purchase any new rolling stock at the present time, as reported in the ELECTRIC RAILWAY JOURNAL of May 8, 1909.

Milwaukee Electric Railway & Light Company, Milwaukee, Wis., is preparing plans and specifications for 100 double-truck city cars. It is planned to build the bodies of these cars of steel below the window rail and to introduce several new detail features of design.

Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia., has ordered five single-truck cars from the McGuire-Cummings Manufacturing Company, Chicago. Mention of the contemplated purchase of this rolling stock was made in the ELECTRIC RAILWAY JOURNAL of May 29, 1909.

Calumet & South Chicago Railway, Chicago, Ill., it is learned, has plans drawn for the funeral cars to be operated by the Chicago City Railway over this company's property. That this company would purchase several funeral cars was mentioned in the ELECTRIC RAILWAY JOURNAL of Dec. 12, 1908.

Interborough Rapid Transit Company, New York, has decided to divide the order for all-steel subway cars between American Car & Foundry Company, Standard Steel Car Company and Pressed Steel Car Company, though no decision has at this time been reached as to how the order will be split up nor has it been definitely decided whether 150 or 250 cars will be purchased.

Port Arthur & Fort William Electric Railway, Port Arthur, Ont., mentioned in the ELECTRIC RAILWAY JOURNAL of May 22, 1909, as asking for bids on four pay-as-you-enter cars, has purchased these cars from the Preston Car & Coach Company, Preston, Ont. The body length is specified to be 31 ft.; length over vestibules, 42 ft. The bodies will be of wood. Westinghouse air brakes, Jenkins' fenders, Crouse-Hinds headlights, four Westinghouse 101-B motors and Brill G-27 trucks were ordered.

Chicago (Ill.) Railways Company placed an order for 350 cars and trucks with the Pullman Company on June 4. These cars are to be of the pay-as-you-enter type and are to have the following dimensions: Over-all length, 46 ft.; length over corner posts, 31 ft. 6 in.; length over crown pieces, 45 ft.; width over drip rails, 8 ft. 4 in.; width over guard rails, 8 ft. 6 in.; height top of rail to top of trolley boards, 11 ft. 8½ in.; wheel base, 19 ft. 11 in.; seating capacity, 40. The special devices called for in the specifications were published in the ELECTRIC RAILWAY JOURNAL of May 22, 1909.

Pacific Electric Railway, Los Angeles, Cal., has ordered 20 interurban and 30 city cars from the St. Louis Car Company. The trucks are being built by the company, and in addition to the bolsters, bearings, axles and car trimmings being furnished by the car builder, the following specifications were drawn on the interurban cars:

Seating capacity	.....48	Curtain material	...Pantasote
Weight, body	.....23,650 lb.	Destination signs,	
Bolster centers, length,	24 ft.	Company's	
Length of body	.....32 ft.	Fenders	..... Worcester
Height over vestibule,		Gears and pinions	..... Bliss
	40 ft. 1 in.	Gongs	..... St. Louis

Width over sills... 8 ft. 1 in.	Heating system,
Width over posts at belt,	Company's electric
8 ft. 1 in.	Headlights, Anderson-Smith
Sill to trolley base,	Journal boxes,
9 ft. 5 $\frac{7}{8}$ in.	St. Louis M. C. B.
Height from top of rail to	Paint....Heath & Milligan
sills.....2 ft. 10 $\frac{3}{4}$ in.	Registers Ohmer
Body	Rollers .....Hartshorn
Interior trim Mahogany	Seats Walkover
Underframe Composite	Step treads.... Am. Mason
Air brakes..West. A. M. M.	Trolley retrievers,
Axles	Company's
Control System,	Trolley poles.....Shelby
West. Multiple	Trolley base,
Couplers	Company's pneumatic
Washburn	Varnish....Flood & Conklin
Curtain fixtures,	Wheels....American Car &
Curtain Supply Company	Foundry Company

Mention of the contemplated purchase of these cars was made in the *ELECTRIC RAILWAY JOURNAL* of May 29, 1909.

TRADE NOTES

John F. Ohmer, president of the Ohmer Fare Register Company, Dayton, Ohio, sailed for Europe on a business trip on June 5.

Belden Manufacturing Company, Chicago, Ill., will soon place on the market a new insulated wire suitable for use in winding armature and field coils for railway motors and generators.

Norvell-Shapleigh Hardware Company, St. Louis, Mo., has appointed J. C. Reed traffic manager. He will assume his new duties in connection with his present position as manager of the railway supply department.

Western Electric Company, New York, N. Y., has sent out a fine bronze desk paperweight. Each side of the disk shows a map of the United States and the location of all the company's sales offices.

Arthur S. Partridge, St. Louis, Mo., offers a large variety of railway generators from 150 kw to 850 kw in size in his schedule dated June 5, 1909. Rotary converters, motors, cars and steam equipment are also listed.

St. George H. Cooke, Assoc. M. Am. Soc. C. E., has changed the location of his offices from the Cambridge Building, Chester, Pa., to the Real Estate Trust Building, Philadelphia, where he will continue to conduct a general civil engineering practice.

Westinghouse Machine Company, Pittsburgh, Pa., has received an order from the Detroit United Railways for another turbine unit. The new turbine is 1000-kw capacity and is to operate at 150 lb. steam, 28-in. vacuum and saturated steam.

Lord Electric Company, 213 West Fortieth Street, New York, announces that it has closed one of the largest orders it has ever received. The contract, which amounts to nearly \$500,000, includes among other of the company's material its well-known laminated soldered rail bonds.

Stromberg-Carlson Telephone Manufacturing Company, Rochester, N. Y., announces that Franz J. Dommerque will represent the company in an engineering and advisory capacity as general representative. Mr. Dommerque is a mechanical engineer and will have his headquarters at Rochester.

Worden-Allen Company, Chicago, Ill., general contractor for fireproof construction and manufacturer of steel construction, with shops at Milwaukee, Wis., and Buffalo, N. Y., advises that J. W. Cowper is now connected with it in the capacity of vice-president. Mr. Cowper was formerly with James Stewart & Company, general contractors.

Meikleham & Dinsmore, New York, bankers and engineers, have moved into new offices on the 16th floor of 25 Broad Street, thus bringing the banking and engineering departments, which were formerly in different buildings, into adjoining suites. The firm has just instituted a department of car design engineering and also one of car equipment financing.

National Railroad Trolley Guard Company, 37 Wall Street, New York, has closed the following contracts for its trolley guard: 900 ft. each to People's Railway, Dayton, Ohio, and Syracuse Rapid Transit Railway, Syracuse, N. Y., and 600 ft. to the Waterloo, Cedar Falls & Northern Railway, Waterloo, Ia. Orders from other railway companies amounting to about 2000 ft. have also been received.

Keystone Lubricating Company, Philadelphia, Pa., states that the Interborough Rapid Transit Company, New York, has adopted Keystone grease for all the escalators at its elevated stations. This service is particularly severe because of the sudden and variable loads on the machinery. The gear cases are packed with No. 4 density, and require no attention for long periods. No. 1 density is used for

other parts where the feed of the lubricant is from grease cups.

Graphite Lubricating Company, Bound Brook, N. J., is sending out to electric railways in all parts of the world an announcement that the United States Navy now has in use 10,298 "Bound Brook" graphite and bronze bearings which, it is claimed, require no oil or grease. Russia and Japan are also extensive users of "Bound Brook" bearings in their navies and shipyards. These self-lubricating bushings give satisfactory service in heavy sizes and under exacting conditions, as well as for lighter uses, such as for trolley wheels.

Arthur D. Little Laboratory, Boston, announces that Karl M. Way, E. M., and Perry Barker, M. S., have been appointed engineers upon the staff of the fuel engineering department of that laboratory. Mr. Way will be connected with the mining branch of the department, and is a graduate in mining engineering of the Ohio State University. Mr. Barker will be associated with the chemical branch of the department, and is a graduate in chemical engineering of the University of Illinois. He was also formerly chemist to the Peabody Coal Company, Chicago, and research chemist at the Illinois State Engineering Experiment Station.

Gulick-Henderson Company, Pittsburgh and Chicago, inspecting engineers and chemists, announces that it has opened an office in New York at 30 Church Street, rooms 517 and 519. Henry Gulick will have direct charge of the office and will be assisted by T. W. Cahill. This company has also retained Samuel E. Duff, the well-known consulting engineer, of Pittsburgh, Pa., to advise and direct its inspectors in matters of engineering, erection and fabricating shop methods. Mr. Duff will continue his general engineering practice, with offices in the Empire Building, Pittsburgh, and will also be represented at the Chicago and New York offices of Gulick-Henderson Company.

New York Switch & Crossing Company, Hoboken, N. J., has built an extension to its works which will increase their capacity about 40 per cent. The new building is fireproof and has a cement floor. It will be fully equipped with modern tools, all arranged to be driven by electricity. A novel method of handling material in the shops which the management has found to be more satisfactory for its particular needs than a traveling crane has been installed. Eight 9-in. girder rails forming runways for trolley hoists are mounted on the roof trusses at intervals across the shop. Each of these carries one Harrington Peerless hoist and trolley carriage. Down the center of the shop and communicating directly with the foundry is a floor track, and by means of the transverse hoists material can be placed in any part of the building without difficulty. One of the overhead girders runs directly into the machine shop, thus forming a connection into this branch of the works also. Among some recent large orders for track layouts and special work which have been received by this company are the following: Brooklyn Rapid Transit Company, Syracuse Rapid Transit Railway Company, Virginia Passenger & Power Company, Public Service Railway, United Traction Company of Albany, Coney Island & Brooklyn Railway. These orders all include the company's well-known Anti-Straddling type of tongue switch.

ADVERTISING LITERATURE

H. W. Johns-Manville Company, New York, has printed a folder on J-M conduits for heating and lighting plants.

Industrial Progress, published at Milwaukee, Wis., in its June issue describes the construction of Allis-Chalmers d. c. railway motors.

Frank Ridlon Company, Boston, Mass., has just issued its June list of second-hand material, which includes an assortment of electrical apparatus.

Stone & Webster Engineering Corporation, Boston, Mass., has issued a series of illustrated blotters entitled "Permanent Versus Transient Organization," "Construction Speed and Low Costs," "Power Station Profits" and "Electrification."

Milwaukee Locomotive Manufacturing Company, Milwaukee, Wis., describes in publication No. 100 its gasoline-driven locomotives. The publication contains a large number of illustrations showing the locomotives used for hauling passenger coaches, line cars, freight cars and for various other services, including industrial plants.

Meikleham & Dinsmore, New York, has published a booklet from its car engineering department entitled "A Car is Not a Car," which briefly states the advantages of having cars ordered by specialists who are not only familiar with every phase of rolling stock, but who also study the conditions of operation to decide on the various details that would give the best results.