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Automatic Signals on Terminal Loops

The installation of automatic block signals on terminal loops where the view is somewhat restricted and the frequency of service is very high will often considerably expedite the movement of traffic. Where a loop terminates in straight track alongside a loading platform it is necessary for cars to move slowly around the curves if other cars may be loading ahead and the view is more or less obscured. The capacity of such a loop is thereby decreased and time is lost when the loop is clear unless some

signal is available to enable motormen to make the maximum acceleration around the loop consistent with its radius and the proper movement of the car. The cost of installing and operating a suitable signal in such cases is a small matter in proportion to the stimulation of movement at a point irregularly congested. The case is practically the same as that of the advance signal installed to protect a train or car standing at a station platform and still permitting cars to approach swiftly when the track in the station around the curve is unoccupied.

Indexing and Filing Technical Papers

An ingenious method of filing technical articles is suggested in a paper on the "Loose Leaf System of Filing," presented by Mr. Hemming at the Cleveland meeting of the Central Electric Railway Association. As Mr. Hemming says, a proper system of filing information adds very much to its value. In fact, if one cannot find what he wants when he wants it, its possession is practically useless, so far as he is concerned. Every one, we believe, has had the experience of recollecting an account in a technical paper of something which he would like to copy in his own practice, but at the time that he read the article he had no need to apply the information, and when he wanted it he could not find it. Again, a company which is considering some addition to its system, portable substations, for example, is anxious to know what has been done by other companies along these lines, and wishes to turn quickly to descriptions of such installations. For this use a good filing or index system is just what is required. We doubt, however, whether the loose leaf system of publishing magazines, proposed by Mr. Hemming, is the most desirable, even if the practical considerations of printing and binding would permit of its adoption and the Post Office Department would have no objection to it. If the magazine was sent out in loose leaves, held together simply by two stay-clips, it would certainly interfere with the convenient handling of the paper by the average reader, and would also prevent its being bound substantially in a volume at the end of the year or half-year. On the other hand, it would seem that the same results secured by the system of filing suggested by Mr. Hemming would be obtained if two copies of a periodical were taken and the pages cut out and pasted on individual sheets.

There is absolutely no doubt, however, that, as Mr. Hemming says, by the intelligent use of any periodical, a subscriber would greatly increase its value to him. The methods of keeping individual indices and of filing articles are almost without number. Many consulting engineers have worked out most elaborate systems, and find that it pays them well to file clippings and record references to articles which they think they will require in the

future. Most of these plans, however, require a great deal of time, and are beyond the needs of the average reader. If the publisher includes a good index with plenty of cross references with each volume of his periodical, this is usually all that is required by the ordinary subscriber, provided he knows how to use the index. The subject of getting the most use out of a technical paper is a very broad one, and we may take it up again in these columns. We are glad, however, that attention has been brought to it at the meeting of the Central Electric Railway Association, and the fact that the method suggested by Mr. Hemming is meeting the need of his road indicates that it is worthy of consideration.

Labor Costs in Power Plants

In analyzing the cost of electric power generated by steam plants the labor expense usually stands second in magnitude, fuel cost easily coming first. A large proportion of the efforts of engineers making a specialty of power-station design and operation has been devoted to the reduction of coal costs per kw-hour on the legitimate principle of aiming at the largest mark in sight. While the labor requirements of plants have been carefully scrutinized, less is known by operating men about the number of men required properly to run a station of given size, the distribution of labor which will give the best service and the relations of station output and equipment utilized to the total number of men on duty in any given shift. It is very desirable that this matter shall be examined more generally by operating officers and if the same methods of plotting the labor service are utilized that are employed in showing the relations of engine and boiler capacity in use to the station load curve suggestive data will be secured.

Some recent labor costs which have come to hand clearly emphasize the necessity of more thorough study of this subject. They show that the size of the plant is not always the determining factor in settling the labor cost per kw-hour, although the logical conclusion would naturally be that the larger the plant the greater would be the labor cost in its total amount, but the less it would be in unit cost. This is the end toward which one must work, namely, securing the maximum output from each generating unit in service consistent with good efficiency and safe heating limits, but it is significant that large output does not in itself alone guarantee low unit cost. Thus, one plant had a yearly output of 5,400,000 kw-hours and a unit labor cost of 0.36 cent. Another station produced 4,650,000 kw-hours with a labor expense of 0.342 cent. In the former case, however, the station design with respect to apparatus arrangement called for the employment of 25 men, while the second plant required only 14 men. In the former case part of the equipment was belt driven and in the latter instance all the equipment was direct connected. The first station had about 1000 kw more capacity than the second at normal rating. The smaller plant of the two operated mechanical stokers and a motor-driven conveying system, while in the first case all firing was done by hand. In the larger plant the total wages cost was about \$19,500, against about \$15,800 in the smaller station. It is clear that the average station wage per man per year

was much greater in the smaller plant or \$1,130, against \$780, in the larger station. These figures show the importance of taking into account a variety of factors in comparing labor costs in plants of dissimilar design. It is worth noting, in passing, that the smaller station turned out its power at a rate of 1.18 cents against approximately 1.25 cents in the larger plant, manufacturing cost per unit.

In two plants of practically the same general design but differing capacity of units the labor cost was .404 cent per kw-hour in the larger station and .310 cent in the smaller installation. The larger plant had a total output of 5,560,000 kw-hours and the smaller one produced 2,830,000 units. The capacities of the stations were as 2½ to 1. The smaller plant had 10 men on its payroll against 14 men in the larger plant. The total cost of labor in the larger station was \$22,500, approximately, and in the smaller one about \$8,700. Per man the smaller plant paid an average wage of \$870 and the larger station the considerable sum of \$1,600. It ought to be borne in mind, however, that in each case where the average wage per station employee per year was higher the plant was located in or near a large city, where the cost of living and the standards of expenditure are naturally much higher than are those of the smaller and more remote centers of population. These figures are not quoted to urge the desirability of reducing wages or running plants short-handed, but they clearly indicate the importance of finding out statistically just what one's plant is doing and making sure that as far as practicable the maximum yearly kw-hour output per man is attained.

Increasing Costs Argued in Milwaukee Case

Testimony before the Railroad Commission of Wisconsin in the Milwaukee fare case has brought out emphatically the effect of the advances in costs of labor and materials on the expense of operation of a street railway. These costs were considered as some of the elements necessitating increases in fares on street railways in Massachusetts during the general movement for a higher unit of revenue per passenger in that State.

Custom and laws have generally required the street railway to adopt an invariable rate of fare for its service of transportation. With the unit of fare fixed, the only source from which the street railway could expect to better its results from passenger business was through an increased density of traffic which would not be accompanied by a corresponding increase in the expense of operation. The street railway is not usually in the position of a private corporation which may advance the rates for its service if existing rates are found to be inadequate or of a manufacturer who advances or lowers the prices of his products with the fluctuations of labor and raw materials, keeping in mind always the proper return upon the investment which he expects to realize.

Since the rate of fare, in most cases, is not subject to variation, while the items of expense, founded on the market prices of labor and materials, are subject to constant movement with the influences of the times, it is apparent that the average street railway, unable to regulate its rates of fare, must regulate its expenditures if it is to preserve the proper relation between income and outgo

necessary to maintain the property on a profitable basis. Because substantially all costs of labor and materials have risen in the last few years and labor has been notoriously inefficient at times, companies have been obliged to watch their resources with constant care and to introduce new economies and equipment, designed to offset in part the influence of the rising tide of prices.

In the course of the history of every street railway a time may be reached when it will appear that the final limit of these possible economies has been attained or that further economies can be instituted only at the expense of a large addition to the capital cost of the property, which may not be warranted. If the only alternatives presented by this problem are those of reduction in service to an inadvisable level or of an increase in the rate of fare, it is certainly in the interest of the community that an advance in fares be instituted, provided it can be arranged without conflict with law or ordinances.

As the advancing costs of labor and materials have tended in Milwaukee, as in other cities, to counteract the financial advantages arising from increasing density of traffic, so the transfer privilege has reduced effectively the gross and net revenue per passenger; and all testimony presented in the Milwaukee case and in other cities where the maintenance of a street railway on a profitable basis is a problem, shows that public estimates of the cost of operation have been too low, and that until recently the baneful result of unrestricted transfer traffic has not been appreciated even by many managers of companies.

Diverse Views on Electric Traction

We always note with interest discussions on heavy electric traction, quite as much perhaps from their psychological features as for their technical importance. The discussion last Friday night at the New York Railroad Club was not greatly different in character from that at the A. I. E. E. last December, in that the claims of each system were strongly advocated by those engineers who had had experience with it. While this of itself indicates disagreement among the highest authorities on the subject, it is in reality an excellent sign. If the user of single-phase apparatus should state that he was inclined to try three-phase next time, if the employer of three-phase equipment should consider that direct current might have eliminated some of the troubles which he had experienced, and if the d.c. engineer should conclude that either one of the other "systems" might have been better, the situation would possess a different aspect.

The net result of the discussion at the club, and also at the Institute, is to show that each method has manifest advantages for certain classes of service and that each is doing excellent work under the requirements which it is called upon to fulfill. But it is equally evident that in the present state of the art none is best adapted to all conditions. It is interesting to speculate what a given railroad now equipped would do if its conditions were radically different from what they are; but the conclusions reached are not exactly illuminating, much less convincing. It reminds us of a claim once put forth by an earnest vegetarian, that Shakespeare, Oliver Cromwell and George Washington would support his views were they now alive.

The fact is that there has not yet been a case in which a general solution of the heavy traction problem has been required. The excellent work that has been done thus far has had the advantage of being, in very large measure, predetermined by existing conditions. Granting these, the decisions reached have been eminently reasonable. The whole matter is still in the formative stage, and is likely to remain there for at least several years to come. The very encouraging feature of the case is that under any given condition of operation, not too broadly generalized, at least one method of electrification can be found that is capable of yielding first-class operative results. In other words, as all the speakers were ready to admit the other evening, heavy electric traction is thoroughly practicable, and between electrical and railroad engineers can be pushed through to success. Whatever branches of the service may be best justified in claiming the chief credit, the battle is in effect won, and railroad electrification is a success. How far it can be economically pushed at this or at some future epoch remains gradually to be determined. As one well-known railway man frankly stated in a recent address, the practical difficulty is in the financial problem involved in the change, rather than in the matter of successful and economical operation. He was speaking in this instance particularly of extensive suburban service, but his words had a broader significance.

It is one thing to realize an economy and quite another thing to take advantage of the knowledge. One may readily point out to the man in the tenement that it is economical to purchase his whole year's coal supply during the low prices of summer, rather than by the hod. The man in the tenement, however, has no option in the matter, and considers himself lucky to have the price of the hod. Now, the fact is that a great many American railroads are not only without large ready funds, but have very nearly reached the end of their borrowing capacity. They have issued securities beyond the limits of their normal earning capacities, and have gradually come to the point where borrowing even for improvements of undoubted value is nearly or quite impracticable when large amounts are involved. There are plenty of railways that could increase their net earnings very considerably by undertaking electrification under favorable conditions, yet cannot raise the necessary funds on account of their past financial policy. There are others that could raise the funds more easily, but still only on terms that would bring a very undesirable burden, too heavy comfortably to be carried. The result of this situation is that while there are many excellent opportunities for electrifying portions of systems, with every chance of profit, the actual work progresses very slowly indeed. In fact, unless practically driven by necessity, as in the case of the Pennsylvania Railroad tunnels and the New York Central terminal work, few railroads in these times are disposed to spend much money for improvements. This condition not only delays the adoption of electric traction, but renders it quite certain that most of the work in the near future will be, as it has been thus far, dealing with special and local problems, which always is a bad thing for progress, in that it tends to opportunist methods which may actually hinder the solution of the more general problems.

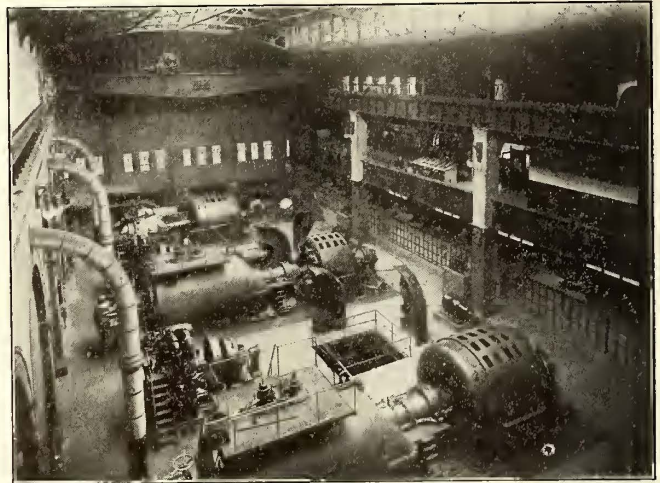
FEATURES OF RECENT ELECTRIC RAILWAY POWER STATION DESIGN

A comparison of the designs of a number of recent electric railway power stations of moderate size reveals some interesting general tendencies of arrangement and equipment; in the details of construction there are, of course, innumerable variations. For the purpose of making such a comparison, data concerning power stations, all built within the last six years, were collected and have been compiled in the accompanying skeleton plans and tables. The stations selected for comparison cover a wide range of types and sizes and represent generating plants intended exclusively for supplying current for electric railway operation and for supplying combined railway, light and power service. They include reciprocating engine, turbo-generator, combined turbine and reciprocating engine and gas engine installations and range in size from 800 kw capacity to 24,000 kw capacity. No large stations located in congested districts of cities have been included, as the size and shape of the available building site for these stations is usually the determining factor in the design.

The two largest stations included in the tables are those of the Twin City Rapid Transit Company in Minneapolis, with 24,000-kw capacity, and the Potomac Electric Company at Benning, D. C., with 23,000-kw capacity. The Minneapolis station operates intermittently in parallel with a water-power station and during the summer is seldom run at its full capacity. It was originally designed as a reciprocating engine plant with four 3500-kw units. In enlarging the station, however, two 5000-kw turbo-generators were installed in the space originally provided for the fifth 3500-kw reciprocating engine unit. The Benning station, which supplies current for the Washington Railway & Electric Company, is a modern plant in which five turbo-generators have been installed, including two 2000-kw units, two 5000-kw units and one 9000-kw unit. The smallest steam power plant included in the list is the 800-kw turbo-generator installation of the Iowa & Illinois Railroad at

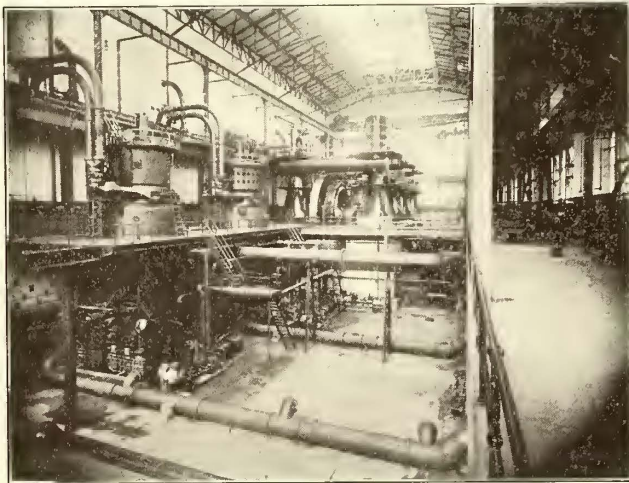
gas engine generator units with a total capacity of 1500 kw. It supplies current for an 85-mile interurban road and operates on natural gas.

The economy of floor space in turbo-generator units of large size has led to radical departures from former practice in the relative size and shape of the engine and boiler rooms of modern stations. In older reciprocating engine plants, the several units were usually grouped in a row in a long and rather narrow engine room. The boiler room was of



Turbine Room of Delaware Avenue Station of Philadelphia Rapid Transit Company

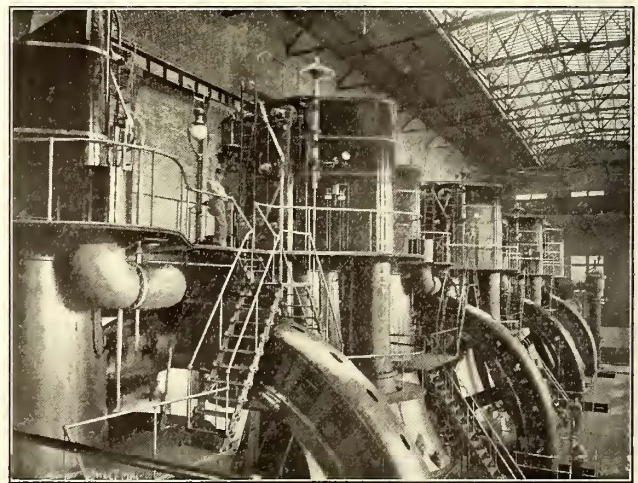
the same length and approximately the same width as the engine room, and the boilers were grouped on one or both sides of a firing alley running the length of the building. Batteries of from one to four boilers were sufficient to supply steam to each of the engines. This typical arrangement is well shown in the plans of the Lincoln, Charleston, Commerce Street and Harvard stations presented herewith. The departure from this arrangement in a modern turbine station is shown in the plan of the Georgetown station



Engine Room of Kansas City Railway & Light Company's Station

Clinton, Ia., which furnishes current for a 37-mile interurban railway.

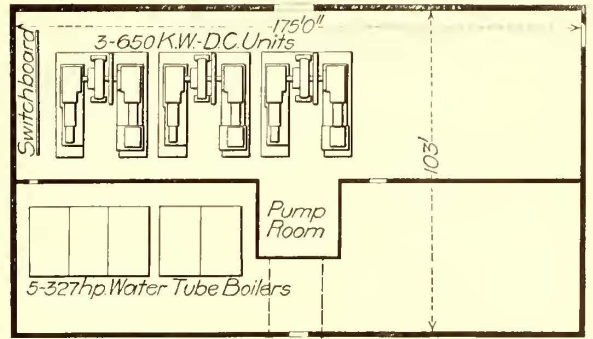
Included in the tables are statistics of two gas engine power stations. One of these, the Somerville plant of the Boston Elevated, is an emergency power station with a capacity of 700 kw and is run intermittently. It is operated with producer gas. The Oleon station of the Western New York & Pennsylvania Traction Company contains three



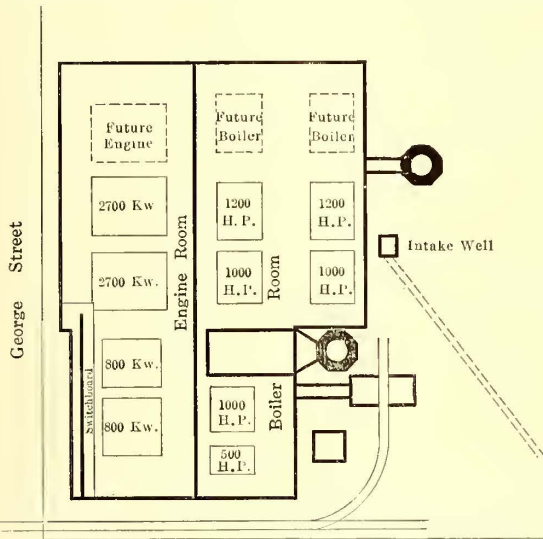
Engine Room of Twin City Rapid Transit Company's Station

of the Seattle Electric Company. Here two Curtis turbines, one of 8000-kw and the other of 3000-kw capacity occupy a space 77 ft. x 62 ft., including the switchboard gallery, which is 17 ft. wide, and the boiler room covers an area 73 ft. 6 in. x 151 ft. The areas per kilowatt of station capacity are respectively 0.43 sq. ft. for the engine room and 1.01 sq. ft. for the boiler room. This unit figure for the engine room is approximately the same as for the

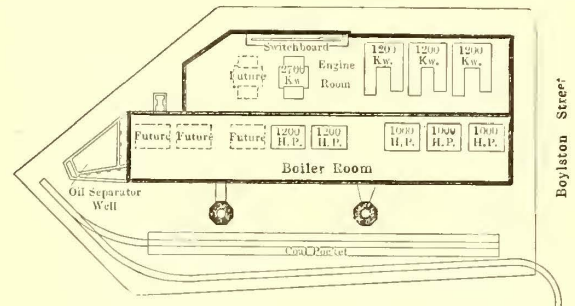
Benning plant, which is 0.42 sq. ft. The Commerce Street station in Milwaukee, which was originally designed for eight reciprocating engine units, is a very compact station of its kind, but the unit engine room area, based on the original installation, is 0.79 sq. ft. The two turbo-units later installed under the switchboard gallery reduce this figure to 0.69, as shown in the tables. It will be seen in the plan of the Georgetown station that the stoking alley in the boiler room is at right angles to the center line



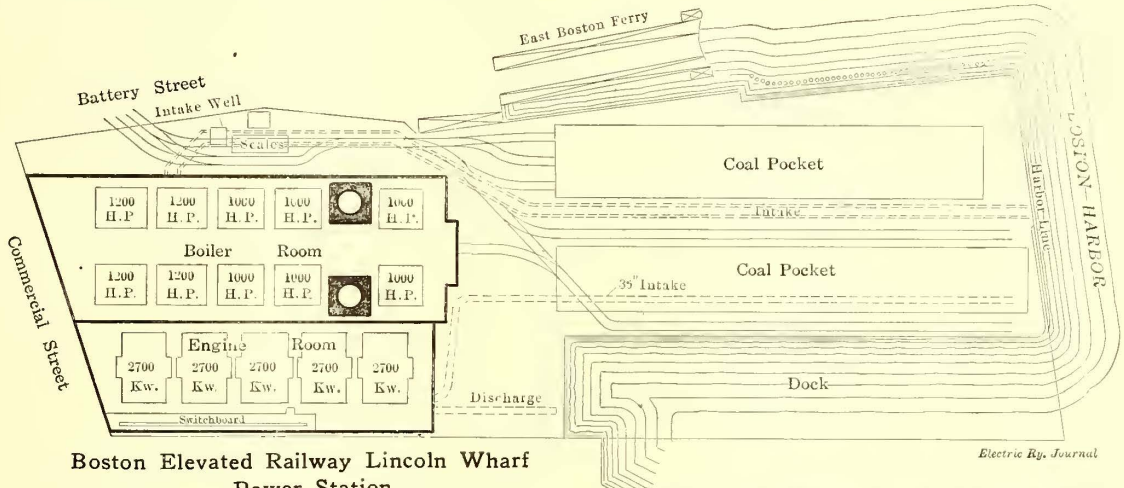
Central Pennsylvania Traction Company Harrisburg Power Station



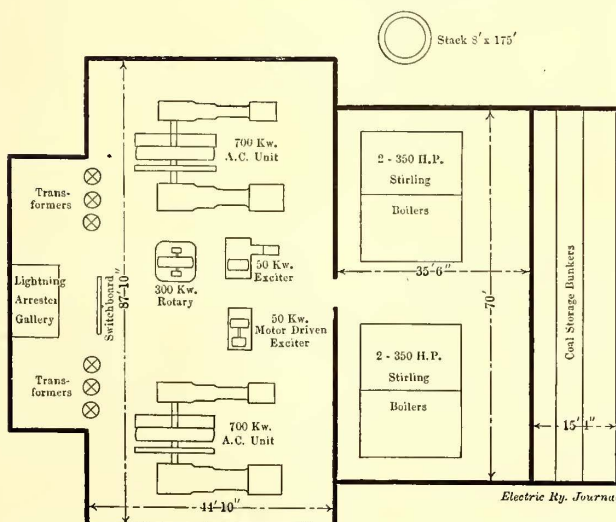
Boston Elevated Railway Charlestown Power Station



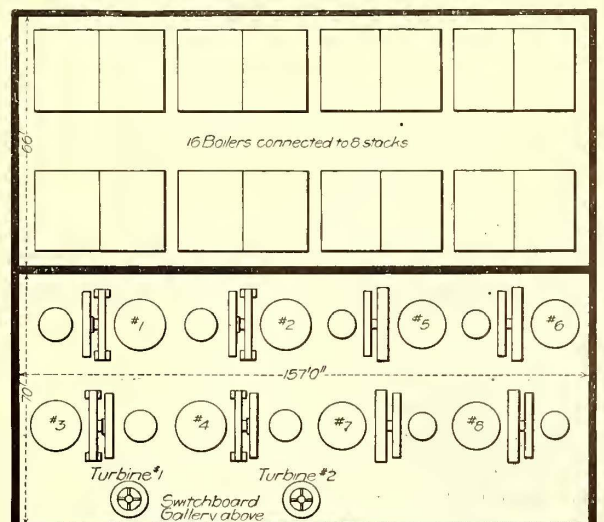
Boston Elevated Railway Harvard Power Station



Boston Elevated Railway Lincoln Wharf Power Station



Indianapolis, Crawfordsville & Western Crawfordsville Power Station



The Milwaukee Electric Railway & Light Company Commerce Street Power Station

of the two generators. The Peoria station and the Delaware Avenue station are arranged in a similar way.

Another radical departure in power-house design made possible by the use of turbines is the double-deck arrangement with the boilers on the lower floor and the turbines directly overhead. The use of double-deck boiler rooms in very large stations is not new, but the placing of the turbines on the upper floor is of very recent date. Two notable stations of this type have been included in the tables. The advantages are a saving in ground space, and in cost of the power-station building, convenient location for condensers and direct steam piping from boilers to turbines. The arrangement is especially suited to horizontal turbine unit installations of moderate size. The lim-

the auxiliary equipment and the substation equipment which is usually installed in the power house, can be grouped in the engine room so as to occupy most of the spare floor space.

The size of boiler units has steadily increased in the last 10 years and single boilers are now being installed with a steam generating capacity of as high as 1000 boiler hp. The largest units shown in the tables are the Parker boilers installed in the Delaware Avenue station of the Philadelphia Rapid Transit Company. These boilers are of the horizontal water-tube type with double grates and are stoker-fired from both ends. The limiting factor in boiler capacity is not heating surface, but grate area and draft. Few large boilers are now hand fired, as the coal consumption under

TABLE I—GENERAL DATA OF ELECTRIC RAILWAY POWER STATIONS.

NAME OF COMPANY	Location of Plant	Total Capacity of Generators K.W.	Kinds of Current Generated	Voltage	Service	Hours Operated Per Day	No. Men Employed	Sq. Ft. per K.W. Engine Room	Sq. Ft. per K.W. Boiler Room	Sq. Ft. per K.W. Engine and Boiler R'm
Aurora, Elgin & Chicago	Batavia	6,000	A. C.	2,300	Railway	24	38	2.78	1.55	4.33
Boston Elevated Ry. Co.	Lincoln	13,500	D. C.	600	Railway	24	68	0.89	1.30	2.19
Boston Elevated Ry. Co.	Harvard	6,300	D. C.	600	Railway	24	46	...	...	...
Boston Elevated Ry. Co.	Charlestown	7,000	D. C.	600	Railway	24	49	...	...	...
Boston Elevated Ry. Co. ¹	Somerville	700	D. C.	600	Railway	...	...	4.52	...	7.43
Central Penna. Trac. Co.	Harrisburg	1,950	D. C.	600	Railway	20	16	2.50	2.50	5.00
Denver City Tramway Co.	Denver	7,500	D. C.	570	Railway	24	23	1.62	1.52	3.14
Ft. Wayne & Wabash Val. ²	Spy Run	8,500*	A. C.	2,300-13,200	Ry. & Lt.	24	19	0.98	1.24	2.22
Illinois Traction System	Peoria	4,000	A. C.	2,300	Railway	24	15	0.78	1.25	2.03
Iowa & Illinois Ry. Co.	Clinton	800	A. C.	360	Railway	19	9	2.20	2.68	4.88
Lackawanna & Wyom. Val.	Scranton	5,000	D. C.	650	Railway	24	25	1.29	1.06	2.35
Little Rock Ry. & Elec. Co.	Little Rock	5,250	A. C.	390-2,200	Ry. & Lt.	24	16	1.88	1.45	3.33
Metropolitan Street Ry.	Kansas City	19,000	A. C.	2,300	Ry. & Lt.	24	91	0.86	2.03	2.89
Mil. Elec. Ry. & Lt. Co.	Commerce St.	16,000	D. C.	600	Ry. & Lt.	24	60	0.67	0.61	1.28
Norfolk & Ports. Trac. Co.	Portsmouth	10,500	A. C.	2,300-13,200	Lt., Pwr., Ry.	24	38	1.25	0.99	2.24
Phila. Rapid Transit Co.	Delaware Ave.	18,000	A. C.	11,000	Railway	19	70	0.69	1.24	1.93
Toledo, Bowl. Green & S.	Findlay	2,000	A. C.	380	Ry. & Lt.	24	11	3.50	4.25	7.75
Twin City Rapid Transit ⁴	Minneapolis	24,000	A. C.	13,200	Railway	20	49	0.68	0.84	1.52
Wash. Ry. & Elec. Co.	Bennings	23,000	A. C.	6,600	Ry., Lt. & Pwr.	24	25	0.42	0.84	1.26
Western N. Y. & Pa. ⁵	Olean	1,500	A. C.	370	Railway	19	4	5.76	...	5.76
Youngstown & Ohio River ⁶	West Point	3,000	A. C.	400	Railway	20	..	1.76	1.71	3.47

*Ultimate Capacity. ¹ Producer Gas Plant—Emergency. ² Double Deck. ³ Double Current Generators. ⁴ Operates in connection with water power. ⁵ Gas Engines—Natural Gas. ⁶ Double Deck.

TABLE II—TURBINE AND GENERATOR DATA OF TURBINE STATIONS.

COMPANY	Location	TURBO-GENERATOR UNITS								EXCITERS		Unit System of Condensers	OPERATING FORCE [†]		
		No. of Units	Cap. K.W.	Make Turbine	Steam Press. Lbs.	Superh at Deg.	R.P.M.	Make Generator	Voltage	Frequency	Unit System		Method of Driving	No. Men	No. Shifts
Ft. Wayne & Wab. Val. ¹	Spy Run	3*	1,500	West-Pars'ns	200	75	1,500	West..	390	25	Yes...	Direct connected...	Yes....	11	2
		2	1,500	West-Pars'ns	200	75	1,200	West..	2,300	60	Yes...				
		1	400	West-Pars'ns	200	75	1,500	West..	390	25	Yes...				
Illinois Traction System	Peoria	1	500	West-Pars'ns	200	75	3,600	West..	2,300	60	Yes...	Turbo-Gen., Motor-Gen.	Yes....	4	2
		2	2,000	Curtis.....	185	120	750	G. E.,	2,300	25	No....					De Laval Tur.	Yes....	4	2
Iowa & Illinois Ry. Co.	Clinton	2	400	West-Pars'ns	150	100	3,600	West..	360	25	Yes...	Turbo-Gen...	Yes....	19	3
		1	1,500	Curtis.....	185	130	900	G. E.,	11,000	25	Yes...				
Norfolk & Ports. Trac.	Portsm'th.	3	3,000	Curtis.....	185	130	720	G. E.,	11,000	25	Yes...	West. Com pound Eng	Yes...	22	3
		2	6,000	West-Pars'ns	175	125	750	West..	13,200	25	Yes...				
Phila. Rapid Transit Co.	Del. Avd...	1	6,000	West-Pars'ns	175	125	1,500	West..	13,200	25	Yes...	2 eng. driv en and 1 mot'r driv'n	Yes...	15	3
		2	2,000	Curtis.....	185	150	750	G. E.,	6,600	25	No....				
Wash. Ry. & Elec. Co.	Bennings	2	5,000	Curtis.....	185	150	750	G. E.,	6,600	25	No....	Eng. driven...	Yes....	2	2
		1	9,000	Curtis.....	185	150	750	G. E.,	6,600	25	No....				
Youngst'n & Ohio River	West Point	3	1,000	West-Pars'ns.	200	None	1,500	West..	400	25	No....				

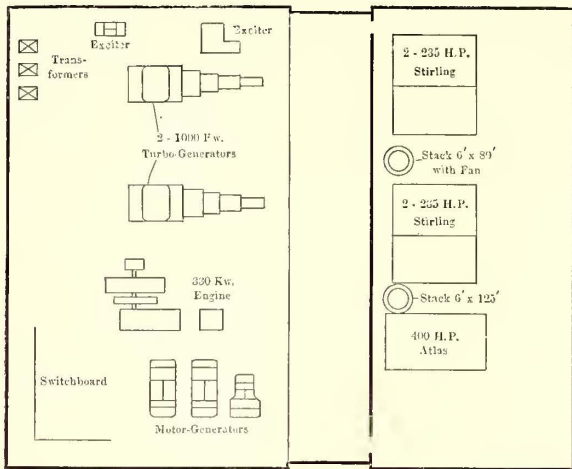
¹ 60-cycle units generate two-phase current for lighting; 25-cycle units generate three-phase current for railway. [†]Based on ultimate capacity. [†]Includes switchboard attendants.

iting feature is the floor area of the boilers required for furnishing steam. Modern water-tube boilers in large sizes require from 0.35 sq. ft. to 0.70 sq. ft. and even more per boiler horse-power. Assuming 0.75 boiler horse-power per kilowatt capacity of the generators, which is a fair ratio, the area of boiler setting per kilowatt runs from 0.26 to 0.52 sq. ft. The actual floor space required for horizontal turbo-generator sets varies from 0.2 for the small sizes, to 0.10 for sizes approximating 3000-kw capacity. Very large double-flow turbines would require only 0.06 sq. ft. It will be seen that unless double-deck boiler rooms are employed, there would be a large excess of floor space in the engine room in stations of very large capacity. In small stations

heavy peak loads is more than manual labor can handle and close regulation is not so easily obtained. Mechanical draft is coming into more general use in railway power plants on account of the increase in boiler capacity possible in carrying peak loads. Recent experiments of the Technologic Branch of the United States Geological Survey indicate that the normal capacity of boilers can be increased by from 100 to 200 per cent by forcing very large amounts of air through the grates. This increase in the amount of air passed through the grates is possible only with some form of mechanical draft, as the pressure required exceeds that possible to obtain with natural draft in stacks of moderate height.

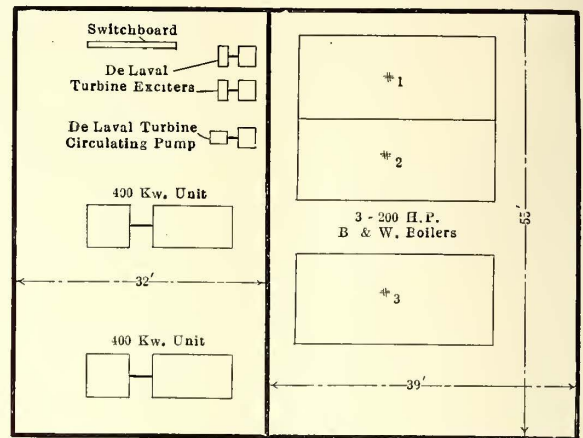
With the exception of five of the smaller plants all of the stations included in the table are equipped with superheaters delivering steam superheated to from 20 to 150 deg. Fahr. Three of the five plants which do not have superheaters are reciprocating engine stations, while a fourth, the sta-

tion of the Lackawanna & Wyoming Valley, has had a turbine installed after the reciprocating engines were put in service. The West Point station of the Youngstown & Ohio River Railway is the only turbine installation which operates on saturated steam. The double-deck plan of this



Electric Ry. Journal

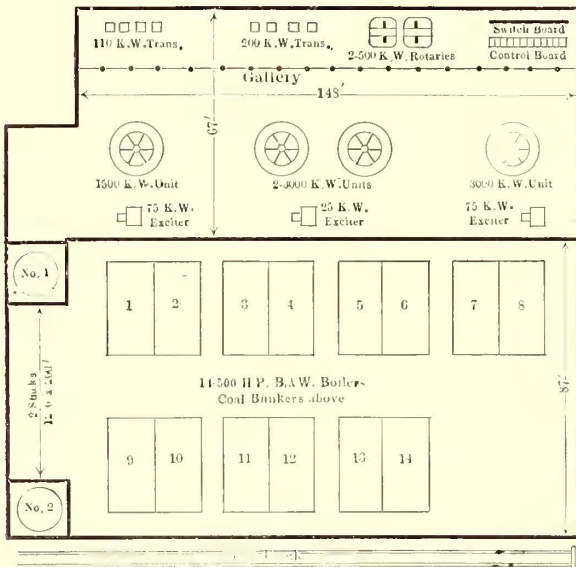
Kokomo, Marion & Western Kokomo Power Station



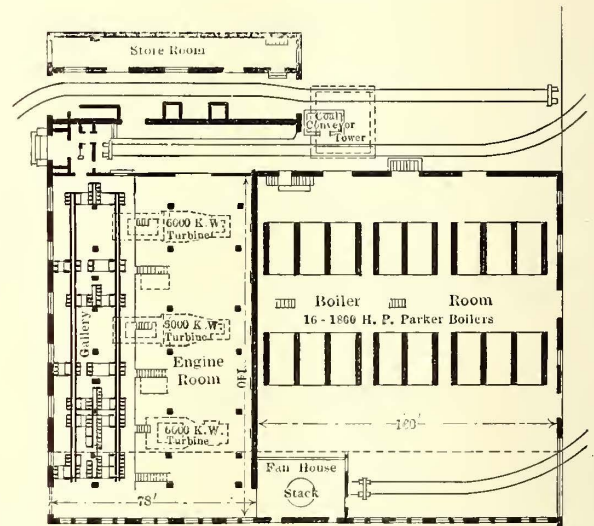
Stack, 6' 6" x 125'

Electric Ry. Journal

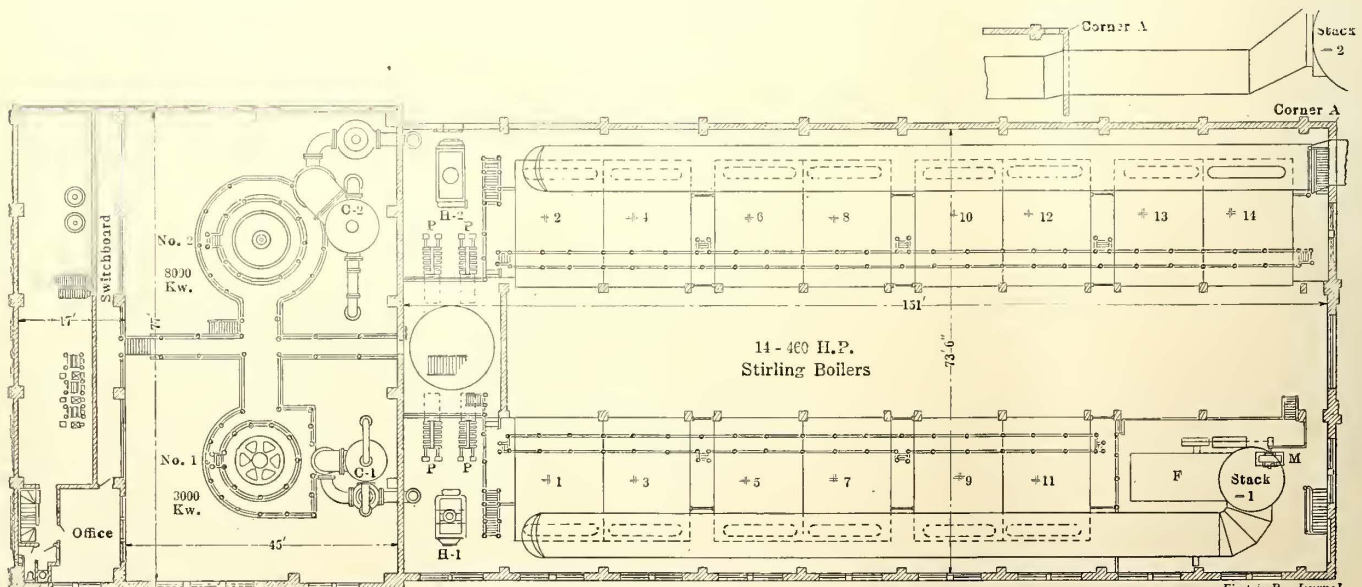
Iowa & Illinois Clinton Power Station



Norfolk & Portsmouth Power Station

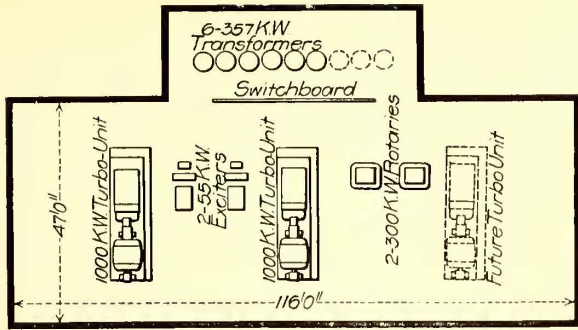


Philadelphia Rapid Transit Company Delaware Avenue Power Station

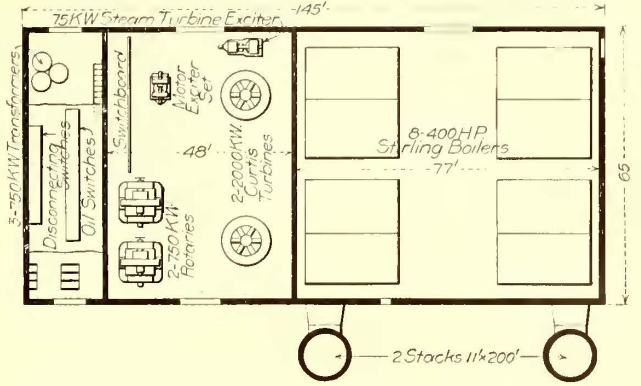


Seattle Electric Company Georgetown Power Station

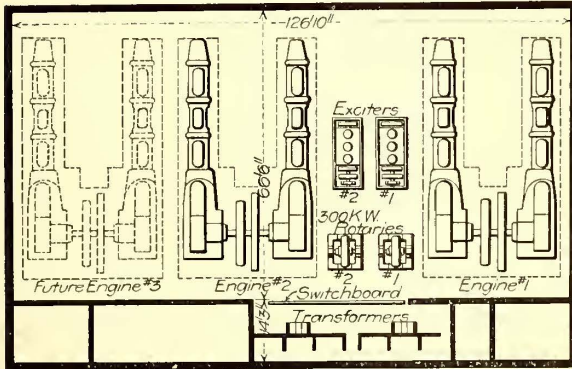
Electric Ry. Journal



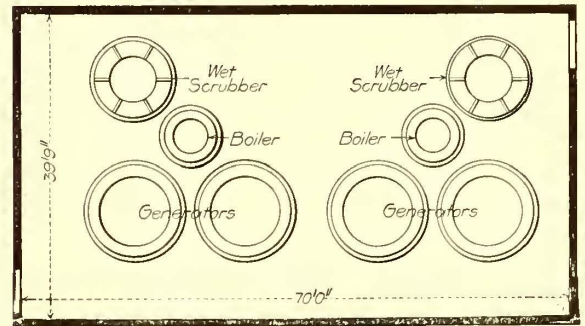
Youngstown & Ohio River West Point Power Station



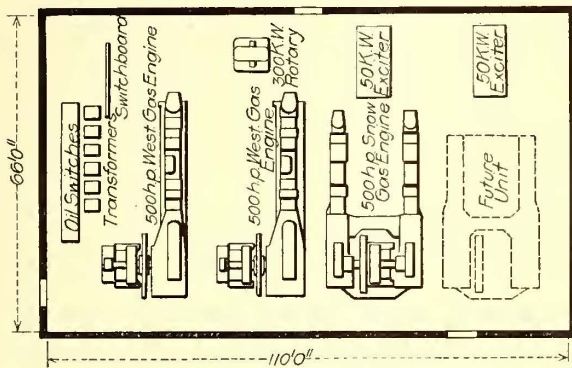
Illinois Traction System Peoria Power Station



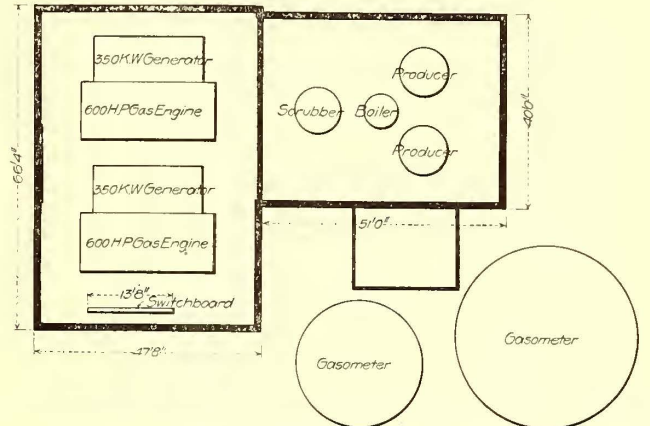
Engine Room of Milwaukee Northern Gas Engine Power Station



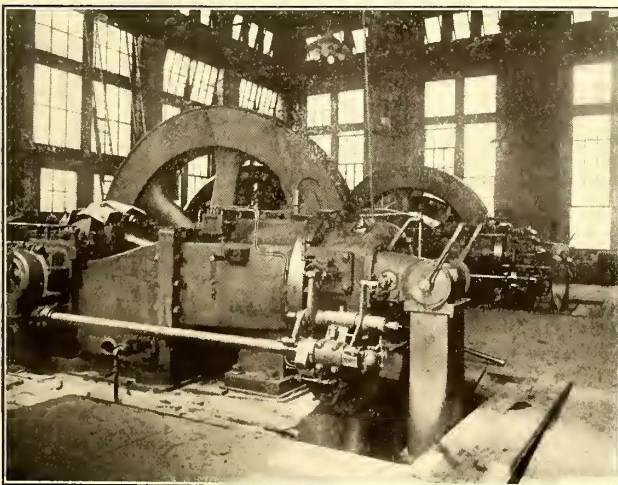
Producer Room of Milwaukee Northern Gas Engine Power Station



Western New York & Pennsylvania Olean Gas Engine Power Station



Boston Elevated Railway Somerville Gas Engine Power Station



Engine Room of Boston Elevated Railway Somerville Gas Engine Power Station



Producer Room of Boston Elevated Railway Somerville Gas Engine Power Station

station, with the turbines directly over the boilers, results in almost an entire absence of entrained moisture in the steam as delivered to the turbine throttles. The low cost of coal in the region in which this plant is situated was also a factor in deciding to omit superheaters as the gain in efficiency of the turbines when using superheated steam measured in cost of coal was hardly enough to warrant the additional cost and complication of installing superheaters.

Other features of the equipment of the stations under review are shown in the accompanying outline plans and tables.

ELECTRICAL NIGHT AT THE NEW YORK RAILROAD CLUB

The greater part of the proceedings of the New York Railroad Club on Friday evening, March 19, was given up to a discussion on the "Approaching Transfer of the Electrification Problem." The first speaker, William McClellan, said that the problem of electrification was now transferred from possibility to practicability; in other words, that the electrical engineer would have to give way to the railroad engineer familiar with the broader financial aspects of heavy railroading. The electrical engineer need not necessarily drop all connection with the work, but if he is an electrical engineer and nothing more, his sole function will be the perfection of details and methods. Railroads are now confronted with no less than five different electric systems, any one of which would probably do the work reliably with more or less economy and would be financially practicable. These systems are the 600-volt, d.c. third-rail; the 1200 volt or higher d.c. third-rail or trolley; the high-voltage a.c. single-phase; the high-voltage a.c. three-phase, and various gasoline-electric or straight gasoline cars. All of these have their own advantages under certain conditions, but they will not command real backing until there is a practical unanimity among technical men as to what simple or composite system is generally applicable. The simplest method appears to be the use of a high-voltage system for trunk lines, with either low a.c. or d.c. voltage in cities. The low-voltage a.c. was preferable to d.c. because the potentials could be varied so easily. The speaker thought that now was the time to consider the standardization of certain features of heavy electric lines, like the location and type of third-rail and shoe; location of overhead contact conductor; side and top clearances; location of end couplings; low voltage for d.c. and a.c. on third-rail and overhead contact lines; high voltage for overhead contact lines; frequency of alternating current. Such standardization might well be confided to a committee appointed by the American Institute of Electrical Engineers, acting jointly with the several steam railroad organizations. He regarded it as a maxim that no feature of electrification design should hamper railroad operation proper.

W. S. Murray, electrical engineer of the New York, New Haven & Hartford Railroad, said that electrification depended on two things, law and economy. Experience has shown that electrification must take place in cities with great terminals and on mountain divisions of railroads where the ruling grade indicates that trains can be handled more cheaply by electricity. He quoted some interesting figures on the electrification of Prussian State railways, printed in the United States consular reports, according to which the present capitalization of the Prussian State railways is \$2,250,000,000; length of single track, 12,785 miles; annual operating expenses, \$241,796,000; an-

nual receipts, \$404,483,000. It was assumed that power could be delivered at 0.833 cent per kw-hour, if the alien stations supplying the same were allowed 4 per cent interest on their investment and that the power was being transmitted for distances up to 125 miles. The cost of the electric system, inclusive of distribution and transformer houses, was over \$234,500,000. It was estimated that the present number of steam locomotives could be replaced by electric locomotives numbering 30 per cent less. The cost per pound of electric locomotives was estimated at 18.34 cents and that of steam locomotives at 11.86 cents. The report concluded that the economies of electric traction warranted electrification. Standardization was a very dangerous proposition just at present, but certain things had been accomplished in the several systems which would bear discussion in detail. Evidently the power conditions of steam railroad operation must be different from those on street railways, for direct current had been used on the latter for 20 years without any important applications to the former. On the other hand, the alternating current had behind it the advantages of long distance and capacity long before it was applied to railway work. For the past four years he has had the opportunity of observing the operation of a.c., d.c. and steam on the same train, and he was convinced that if any railroad has a situation similar to that of his own, it should adopt alternating current. He believed, however, that low-voltage generators should be used; that is, the high voltage should come from the transformers rather than from the generators direct. The transformers may be said to introduce a softening effect between the contact line and the generators. The cost and efficiency per kilowatt installed would not be seriously affected by this arrangement, because the efficiency of the low-voltage machines is higher and the transformer losses are so low that the combination will give an output equal to the high-voltage machine alone. The difference in initial cost is slight. Mr. Murray also referred to the use by the New Haven railroad of its steel working conductor, which he compared to the use of a floor on the members of a bridge. The steel wire is easily replaced and costs but 4 or 5 cents per pound, as against 20 to 25 cents per pound for copper or phosphor bronze. The wear of the steel wire has been only 0.0005 in. in six months at the worst places on the line. As regards frequency, he did not wish to say that he was absolutely in favor of 25 cycles, but stated that its advantages should not be overlooked, especially as there are many plants where 25 cycles is the standard frequency.

Mr. Murray mentioned that the New Haven railroad's electric zone had originally been sectionalized about every 1½ miles, but said the sections were now much longer. It is useless to have the section breaks at points where they cannot be utilized by crossovers. The latter, therefore, are very important in fixing the length of sections, which, consequently, are not amenable to standardization. The electric zone of the New Haven railroad comprises three terminal runs, respectively 17.25 miles to New Rochelle, 25 miles to Portchester, and 33 miles to Stamford. The engine mileage is about 210 miles a day per annum for each electric locomotive, while statistics on 115 steam engines doing inter-division work showed an average of 158 miles. It was apparent, therefore, that in replacing the steam locomotives by electric stock one should bear in mind these differences in ability to make mileage. Mr. Murray then compared the speed-torque curves of steam and electric locomotives.

N. W. Storer, of the Westinghouse Electric & Manufacturing Company, spoke of the studies and efforts now under way toward the electrification of terminals in large cities. The recent decision of the Pennsylvania Railroad to use direct current in New York was influenced by the fact that it already had a heavy d.c. investment on Long Island and that much of the new work would be through tunnels, but he believed that should the Pennsylvania Railroad consider electrification of long distances between cities it would tend to favor the single-phase. The Great Northern Railroad was the only one in the United States which had adopted three-phase operation. There was no question that three-phase motors can be used, but not for general railway service. They are not adapted for multiple-unit trains, and with the frequency of 15 cycles the speed of a two-pole, three-phase motor is only 900 r.p.m., whereas standard railway motors are running at 1500 to 1800 r.p.m. Such a three-phase motor would be a poor one to have, and if four poles were used the speed would be reduced to 450 r.p.m., making a very large motor. On one of the Italian railways he had seen a locomotive with two three-phase motors, one having eight poles and rated at 1500 hp, the other having 12 poles and rated at 1200 hp on an hourly basis. But since the motors could not be operated together at their highest speeds, it would be wrong to state the total output as 2700 hp. The constant speed characteristic of the three-phase motors also makes them uneconomical for railway service, aside from the double overhead trolley. In conclusion, he added that electrification must not be considered simply from the point of cars and locomotives. Single-phase locomotives did not cost so much more that their price should frighten any one, and if the equipment was 10 to 12 per cent heavier, it produced a saving of 25 to 40 per cent in the cost and efficiency of the transmission system.

E. B. Katte gave the following figures on the reliability of the New York Central electrical service during 1908: There was not one minute delay because of the power station, substations or transmission lines; delays from feeders, 7 train minutes; from third-rail, 150 train minutes; from locomotives, 400 train minutes. The total locomotive mileage was nearly 1,000,000. The multiple-unit cars traversed 3,500,000 miles with train delays of 830 minutes, about equally divided between electrical and mechanical causes. The total number of train minute delays from all causes was 1400, and the average train miles per minute delays was over 3000. The average number of electric train movements per day was 450 and the amount of current generated for the service 120,000 kw-hours.

C. L. Muralt said that a great deal of standardization really has been going on in the past. Power plants, for instance, had practically adopted 25 cycles, although it might be noted that the Swiss study commission on electrification had recommended a frequency of 12 to 15 cycles. The transmission and distribution systems had also practically standardized. The one large problem which remained was the standardization of rolling stock motive power. There was no good reason why electric rolling stock should be limited to one type any more than steam locomotives are at the present day. It was not correct to assume that the three-phase motor could only operate on low frequency, as there were over half a dozen three-phase lines on the Continent now using 40 cycles or more. The 1200-hp and 1500-hp motors mentioned by Mr. Storer give in tandem a total slightly less than 2700 hp. Three-phase locomotives weigh even less than d.c. locomotives. He then criticised

the weight and performance of the New Haven locomotives, and drew some speed-torque curves to indicate the superiority of the three-phase locomotive.

H. G. Stott, superintendent of motive power, Interborough Rapid Transit Company, indorsed the remarks that Mr. McClellan had made on standardization, and thought that it was time to concentrate attention on the location of the contact rail and overhead wires.

N. W. Storer, replying to Mr. Muralt, said that while three-phase motors could be used with high frequencies, they operated better on low frequencies. He had made some calculations on three-phase locomotives to fulfill the conditions of the New Haven electric zone service, and found that it would require a 1500-hp locomotive to handle the loads and give the maximum speed of 50 m.p.h., which is now given by a 1000-hp single-phase locomotive. Furthermore, the single-phase locomotive, in spite of its greater weight, would require less power, because it has no rheostatic losses during acceleration. The single-phase locomotive also has the advantage of being able to increase its speed when necessary.

W. S. Murray stated that the New Haven locomotives were intentionally designed for operation in multiple, because 80 per cent of the New Haven train-weights range between 200 and 250 tons, which is the unit capacity of one locomotive. It was thought better to have two locomotives ready for the few heavy trains than single larger locomotives, which would be operating inefficiently with most trains.

Dr. Cary T. Hutchinson said that he had decided in favor of three-phase operation on the Great Northern Railroad because he believed the three-phase motor best adapted for the heavy trains and grade on the division being electrified. The motors were extremely simple and hardy, and the power tests made were away above the guarantees. He considered it the most powerful electric motor in existence, whether a.c. or d.c. The hourly rating of each motor is 540 hp, and for the four motors 4000 hp; the continuous ratings are respectively 420 hp and 1700 hp. The operating officials of the Great Northern Railroad did not object to having a constant speed of 15 m.p.h., whether going up or down a 2 per cent grade. He had also received a report favoring three-phase from an engineer who was working on plans for the electrification of a western division of a trans-continental railroad. He felt quite certain that the Pennsylvania Railroad would seriously consider the adoption of three-phase motors on the low-grade freight line between Harrisburg and Trenton.

N. W. Storer, referring to Dr. Hutchinson's remarks, said that he was now designing a single-phase locomotive having a continuous capacity of 2750 hp and capable of running on 2 per cent grades at 20 m.p.h. Mr. Muralt said that he also had under consideration a 6000-hp, three-phase locomotive, but after all there need be no dispute as to the limits of horse-power capacity in any form of electric locomotive.

After brief remarks by other members the meeting was adjourned.

At the Cedarburg shop of the Milwaukee Northern Railway a pair of bare copper wires installed between two roof-supporting columns along a repair track are connected with the telephone circuit leading to the dispatcher's office, and afford a ready means for testing in the shop the portable telephone sets and hook attachments carried on the car.

RECORD SYSTEM OF THE THIRD AVENUE RAILROAD COMPANY, NEW YORK

In connection with its system of car maintenance, the Third Avenue Railroad Company, of New York, has developed a number of forms which have proved themselves extremely valuable in recording the performance of equipments in detail and providing a check on the general efficiency of the inspection and repair departments.

The foundation of the record is the motorman's signing-in sheet which is placed on a table in each depot. As shown

..... Division Date 1909

Run and Car Nos.	Motorman	Badge No.	Time On	Time Off	No. Trips	Condition of Car	Inspected By
Run No.							
Car							
"							
"							

Fig. 1—Motorman's Signing-In Sheet

in Fig. 1, this form gives the name of the motorman, the run number, car number, car condition, time on, time off, trips and destination. The run number is put in by the despatcher only. All of this data is transferred to a large book, each page of which has enough rules to permit a daily record for three months. For brevity's sake, the trouble reported by the motorman is indicated by a symbol and thus one can tell almost at a glance how a car has behaved over the comparatively long period of three months and easily trace the responsibility for the defects indicated. The

EMERGENCY "RUN IN" OF CARS AT CAR BARN DATE 190..

Car No.	Time	Delay in Schedule	Line	Motorman's Report of Trouble	Car House Foreman's Report of Trouble

Fig. 3—Report of Cars Pulled In

form most closely related to this book record is Fig. 2, the division foreman's daily report of cars inspected at his car house. This is turned in every morning and gives the superintendent of equipment an accurate idea of what is going on throughout the system. Fig. 2, it should be understood, covers all cars. However, those which are in for emergency reasons are recorded in red on the regular three months' record. Fig. 3 is the form sent in by foremen for these emergency or pulled-in cars. This sheet gives the car number, badge number, time, delay in schedule, line, motorman's report of trouble and car-house foreman's report of

the main office and the third going to the Public Service Commission. The troubles shown on the run-in sheet are carefully analyzed by the mechanical department, which knows from its card records the name and type of the apparatus which gave trouble on the cars reported. This is

DAILY REPORT OF MECHANICAL DEPARTMENT
Date.....
General Manager.....

CARS TAKEN OUT OF SERVICE	65TH STREET AND 3RD AVENUE		SUMMARY	
	From First	This Date	From First	This Date
Defective Equipment				
	W. H. 56 Motors			
	W. H. 68 Motors			
	W. H. 69 Motors			
	G. E. 210 Motors			
	Other Types			
	Broken Motor Shell			
	Motor Leads			
	Brush Holder			
	Cables			
	Controllers			
	Circuit Breakers			
	Resistance			
	Light Wiring			
	Plows			
Trucks				
Gears				
Pinions				
Journals				
Brakes				
Wheels (Steel)				
Wheels (Cast)				
Fender and Pilots				
Car Bodies				
Register				
Sand				
Total Cars Removed				
Other Purposes				
	Inspection			
	Cleaning			
	Damages			
For Defects Found O. K.				
Total Cars Removed				
No Cars in Service 6 P.M.				
Extra O. K. Cars 6 P.M.				
Bad Order Cars 6 P.M.				
Cars in General Repair Shop 6 P.M.				
No. Cars Overhauled				
No. Cars Rewired				
No. Trucks Rebuilt				
No. Cars Repainted				
No. Men Employed (Inspt.)				
No. Men Employed (Gen'l Over)				
Per Cent. Cars taken out of Service for Defective Equipment				
Per Cent. Cars taken out of Service for Other Purposes				

Supt. of Equipment.....

Fig. 4—Progressive Report of Car Defects

DIVISION..... DATE..... 190..
Cars in Car House from 6 A.M. to 5 A.M.

A.M.	6	7	8	9	10	11	12	P.M.	1	2	3	4	5	6	7	8	9	10	11	12	A.M.	1	2	3	4	5

Fig. 5—Hourly Report of Cars in House

THIRD AVENUE RAILROAD COMPANY
FREDERICK W. WHITRIDGE, Receiver
Date..... 190..

CAR HOUSE.....

Car No.	Arma-tures	Motors Oiled	Brush Holders	Motor Leads	Con-troller	Re-sistance	Circuit Breaker	Plows	Lights	Heat-ers	Car Bodies	Sand	Gongs	Regis-ter	Trucks	Brakes	Wheels	Remarks	

Immediately after inspecting a Car, the Inspector will sign his initials under the part or parts inspected, and directly opposite the Car Number, which he will fill in. Twelve hours ending..... 190.. Foreman.....

Fig. 2—Daily Report of Cars Inspected at Division Car House

trouble, the latter information being derived from the car inspector's signed slip. This run-in sheet is made out in triplicate, one remaining with the foreman, another with

detailed on a form, Fig. 4, which is signed by the superintendent of equipment and forwarded to the general manager every day.

Fig. 4 is really a progressive report, inasmuch as the percentage of cars taken off the line for defects or otherwise is given for the part of the month already expired, besides the

houses, with a summary column, as shown. It also shows what extra work is going on at each depot and how many men are employed. The information on this form is after-

COMPRESSOR ARMATURE RECORD

MAKER'S NO.		NUMBER.						
TYPE		DATE RECEIVED						
MAKER								
Car No.	Date In	Date Out	Com. Turned	Diam. Before	Diam. After	Over-hauled	Mileage	Remarks

COMPRESSOR RECORD

MAKER'S NO.		NUMBER.			
TYPE		DATE RECEIVED			
MAKER					
Car No.	Date In	Date Out	Date Overhauled	Mileage	Remarks

CONTROLLER RECORD

TYPE	DATE RECEIVED.	No.		
Car No.	Applied	Removed	Overhauled	Remarks

ARMATURE RECORD

MAKER'S NO.		No.							
TYPE		DATE RECEIVED.							
Car No.	Motor No.	Ap-plied	Re-moved	Com. Turned	Diam. Before	Diam. After	Mile-age	Gen'l Repair	Re-marks

WHEEL RECORD

MAKER.		No.				
TYPE		DATE RECEIVED.				
Car No.	Applied	Removed	Mileage	Turned	Diam.	Remarks

MOTOR AND TRUCK REPORT

TRUCK No. { No. 1 No. 2	CAR No.	DATE	SHOP
Repairs Needed		Gear Ratio	
Type Motor		Repairs Made	
<i>Removed</i>		<i>Cause</i>	
<i>Put In</i>			
No. 1. Motor No.	Arm. No.	Motor No.	Arm. No.
No. 2. Motor No.	Arm. No.	Motor No.	Arm. No.
Wheel { No. 1. Dr. No. 1. Py. " "	" "	Wheel { No. 1. Dr. No. 1. Py. " "	" "
Nos. { No. 2. Dr. No. 2. Py. " "	" "	Nos. { No. 2. Dr. No. 2. Py. " "	" "
Style "Dr." Wheels	Size	Style "Dr." Wheels	Size
Style "Py." Wheels	Size	Style "Py." Wheels	Size

Foreman

Fig. 6—Headings of Equipment Record Cards

CHANGE OF EQUIPMENT

.....SHOP				DATE.....19.....				
I have this day REMOVED the following equipment from CAR No.				I have this day PLACED the following equipment in CAR No.				
Description	No. Re-moved	Type	Shop No.	Cause	Description	No. In-stalled	Type	Shop No.
Controller					Controller			
Motor					Motor			
Armature					Armature			
Trucks					Trucks			
Resistance					Resistance			
Circuit					Circuit			
Breaker					Breaker			
Register					Register			
Plow					Plow			
Compressor					Compressor			
Compressor					Compressor			
Armature					Armature			
Equipment removed at Car Barn or Shop, and sent to Shop								
REMARKS:								
Foreman.....								
Shop.....								

Fig. 7—Record of Change of Equipment

daily record. This form lends itself readily to a comparison of all the car houses day by day and month by month. The actual form has parallel columns for the other car

REPORT OF TURNING WHEELS

Date.....19.....		
Wheel No.	Style	Make
Received from.....	Shop.....	19.....
Reason for Turning or Grinding		
Measurement (Diameter) before Turning		
Measurement (Diameter) after Turning		
Tire Loss (Calipered).....		
Work done by.....Date.....19.....		
Inspected by.....		
Foreman.....		
No. of Wheel Scrapped.....Date.....19.....	No. of Axle Scrapped.....Date.....19.....	No. of Tire Scrapped.....Date.....19.....
Reason for Scrapping.....Date.....19.....		

Fig. 8—Report of Turning Wheels

REPORT

RENEWAL OF WHEEL, TIRE AND AXLE

Wheel No.	Tire No.
Make of Wheel.....	Make of Tire.....
Wheel Fitted by.....	Tire Fitted by.....
Pressed on by.....	Outside Diameter.....
Tons Pressure.....	
Axle No.	
Make of Axle.....	
Size of Axle.....	
Fitted by.....	Date.....19.....
Inspected by.....	
Foreman.....	

Fig. 9—Report of Renewal of Wheels and Axles

FOREMAN'S DAILY REPORT OF COMMUTATORS TURNED

DATE.....	LOCATION.....			
Armature No.	Tape	Size Before Turning	Size After Turning	Remarks
Foreman.....				

Fig. 10—Report of Commutators Turned

ELECTRICAL CAR HOUSES DEP'T

Oil and Grease Report for190.....

Division	On Hand 1st, 190	Received	Material	Used	On Hand 1st, 190
	bbls.	bbls.	Motor Grease		bbls.
	"	"	Gear Grease		"
	"	"	Elec. Car Oil		"
	"	"	Kerosene		"
	bbls.	bbls.	Motor Grease		bbls.
	"	"	Gear Grease		"
	"	"	Elec. Car Oil		"
	"	"	Kerosene		"
Used On	Motor Grease	Gear Grease	Electric Car Oil	Kerosene	
Sand Cars					
Scrapper Cars					
Sweeper Cars					
Freight Cars					
Wheel cars					
C. H. Foreman					

Fig. 11—Monthly Oil Report

ward worked up into equipment record curves as described in the article on this system published in the Feb. 20 issue.

Fig. 5 is a reproduction of the hourly report sheet, made

out and forwarded by the car-house foreman to headquarters every day. This report is valuable, as it shows just how each depot is handling its rolling stock.

The equipment record is kept entirely on 8-in. x 5-in. cards made out in different colors and headings for motors

MILEAGE RECORD							
Date	Miles	Date	Miles	Date	Miles	Date	Miles

Fig. 12—Car Mileage Record

and trucks, armatures, controllers, etc., as reproduced in Fig. 6. The data for these cards are obtained from the several daily shop reports described hereafter. These forms contain all necessary information to keep up a card record which will show just where any given piece of equipment may be found. The shop blanks are reproduced in Figs. 7 to 10, as follows: Fig. 7, covering change of equipment on a given car; Fig. 8, report of wheels turned; Fig. 9,

THIRD AVENUE RAILROAD COMPANY
FREDERICK W. WHITRIDGE, Receiver
.....Department

MACHINE SHOP ORDER

To.....Date.....19.....

ESTIMATED COST \$.....

Signed..... Charge to.....
Foreman

Approved..... Approved.....
Head of Department Supt. of Equipment

Order referred for Execution to.....19.....
Supt. of Equipment

This order to be used by all Departments requiring work done by the Mechanical Department. Duplicate to be retained by Issuing Department and original to be forwarded to Superintendent of Equipment.

Fig. 13—Machine Shop Order

report of wheel set renewals, and Fig. 10, report of commutators turned. Fig. 11 shows the monthly oil report.

The individual car mileage, furnished daily by the transportation department, is transferred to a card file kept on a progressive form, Fig. 12. When the car has made 10,000 miles the motor and truck report card (Fig. 6) is sent to the general foreman with the notification that the car is due for general overhauling. If any particular part has been found to give unusual trouble, a reference to that fact is made. After the overhauling is completed, the card is returned to the office, showing the numbers of all parts removed and installed, as well as a general statement of the work done in the repair shop. The 10,000-mile overhauling basis brings a daily reduction of six to four cars a day as compared with overhauling every 60 days. Car inspection was formerly on a seven-day basis, but by changing this to a basis of 800 miles, there has already been attained a reduction of 10 cars a day. The company now owns 738 passenger cars, of which 300 to 350 are used in winter.

Machine-shop orders of the type shown in Fig. 13 are made out in duplicate by the subforeman of any department desiring work done by the mechanical department. This form keeps the superintendent of equipment in touch with all non-maintenance work done by the mechanical department.

LIGHTNING PROTECTION DEMONSTRATED

At the meeting of the Railway Signal Association, held in Chicago on March 15, a feature was an interesting lecture, accompanied by experiments, on "Lightning Phenomena," delivered by Prof. E. E. F. Creighton, of Union University. Some familiar ground was gone over in this lecture, but in addition there was much in it that was new. The speaker provided apparatus with which he illustrated his remarks. The phenomena of the action of lightning discharge on railway signal lines were illustrated and an improvised circuit was set up in the room. The apparatus consisted of a 16-in. induction coil to produce unidirectional discharges and Leyden jars to produce oscillatory discharges at high frequency. A voltage sufficient to jump a 2½-in. gap at the instrument was created. The impulse was sent around the circuit, at the center of which the spark was made to jump a gap of 5 in., showing that the wave of potential on the line was higher than at the source of the impulse. Where the sparking took place at the middle of the line it was due to a stationary wave, resulting from two waves traveling in opposite directions, meeting there and combining their potentials.

A series of tests was made to illustrate the good and bad effects of the factors involved in lightning protection. Discharges of a frequency of about 3,000,000 cycles were used in connection with a choke coil and needle gap in parallel. By varying the length of the needle gap the discharge was made to take place through either circuit. This is what is called the "equivalent needle gap." The values on this equivalent needle gap were shown for a lightning choke coil, a resistance rod, a multi-gap arrester, an aluminum arrester and a signal arrester. The relative values were as follows:

- Choke coil, 1¾ in.
- Resistance, 1¼ in.
- Multi-gap arrester either 1/3 in. or 1½ in., according to the frequency used.
- Aluminum arrester, too small to measure.
- Signal arrester, about 0.02 in.

Explaining the variation in the case of the value given for the multi-gap arrester, it may be said that since the induction coil gives a single impulse which is equivalent to the customary act of switching on the line, it is equivalent to a low-frequency surge. The multi-gap arrester is not sensitive to this kind of a surge. Its equivalent needle gap is, in fact, about double the sum of the separate gaps in series. The single impulse of the induction coil may be shunted out, leaving only the high frequency of the condenser circuit. It is under this condition that the multi-gap arrester shows its sensitiveness to high potentials. The equivalent needle gap is then only a fraction of the sum of the series gaps of the arrester.

Experiments were also given with a smaller choke coil of double cotton-covered wire, substituted in place of the lightning choke coil. The discharge took place between turn and turn in many sparks, instead of going around through the metallic circuit.

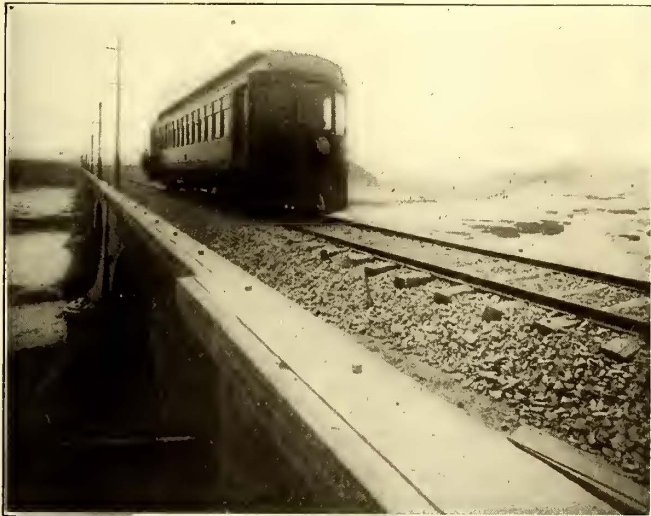
On the evening of March 19 Professor Creighton delivered an address on the same subject before a joint meeting of the Chicago branch of the American Institute of Electrical Engineers and the electrical section of the Western Society of Engineers. W. L. Abbott, of the Commonwealth Edison Company, presided. The speaker covered much the same ground as in his preceding lecture, but he described in greater detail with experimental demonstrations the different methods of conducting electricity. As enumerated these are:

1. Normal ionization of the air.
2. More active ionization by the application of high potential, manifesting itself in brush discharge.
3. The transition from brush discharge to spark discharge.
4. The transition from spark discharge to arc discharge.
5. Conduction in metals.
6. Conduction in special conglomerate materials used in lightning arresters.
7. Conduction in liquids as illustrated by the aluminum cell.

PERMANENT WAY ON BRIDGES

BY DANIEL B. LUTEN, PRESIDENT, NATIONAL BRIDGE COMPANY,
INDIANAPOLIS

An interesting example of permanent way on a bridge is shown in Fig. 1, a view of the new concrete arch bridge on the Lima & Toledo Railway, crossing the Maumee River near Waterville, Ohio, about 15 miles above Toledo. No type of bridge is quite so satisfactory as one that can



Maumee Bridge—Electric Car Crossing in August, 1908

be filled with earth and the track ballasted, to produce the exact conditions of a ballasted roadway on an earth roadbed. This condition is fully met by the reinforced concrete arch with earth filling. So far as roadbed, track and overhead construction are concerned, neither the passenger nor the engineer of maintenance of way would

the same way by poles at intervals of about 100 ft. On such a structure the grade is maintained with the same ease as on the ballasted roadbed in cuts and fills. Every engineer on track maintenance has wrestled with the



Maumee Bridge—Ballast Train on Bridge

problem of eliminating depressions by gradually raising his grade, and has found himself invariably worsted by the lack of solid roadbed across his bridges, which requires that the track shall remain at a fixed elevation at that point. The result is not only a depression as the grade is bettered at adjacent points, but also that the greatest care is required in daping the ties to fit the open superstructure of beams or girders.

The Maumee bridge consists of 12 spans of 75, 80, 84, 87, 89, 90, 90, 89, 87, 84, 80 and 75 ft. each, having a rise of 22 ft. 3 in. to 25 ft. The arches increase in span in a uniform ratio from bank to middle of stream, to emphasize the main spans, and the shorter spans are given less rise and greater loading in order to equalize the thrusts of the arches. As a result the crowns of the arches are arched in a long, graceful curve, while the springings and roadbed remain at a level grade throughout. The roadway is 16 ft. clear between copings.

Centers were struck in the first span after five spans had been concreted in advance, in order that sufficient re-



Maumee Bridge—View of Bridge Under Construction

have any reason to suppose that this stretch of track was not supported on terra firma itself.

The objectionable noise made by high-speed cars on truss or girder bridges is here wholly lacking. No trolley trough is required for overhead construction and broken trolley poles should be no more frequent than at other points on the line, the wires being supported in exactly

distance might be afforded to prevent the completed arch from overturning the light pier on which it is balanced against its neighbor.

The arches are reinforced with 1-in. smooth steel rods following the intrados over the crown and crossing to the extrados at the haunches, spaced 6 in. in the 90-ft. span, and bonded transversely with $\frac{3}{4}$ -in. rods at intervals of 4

ft. and extending upward into the spandrels. The design of arches and reinforcing was based on the Luten patents and empirical formulas. The loading specified consisted of 200-ton cars on two trucks equivalent to 10,000 lb. per



Maumee Bridge—End View, Track Ballasted but Poles Not Erected

linear foot for single track, or about 500 tons on one span.

The contract price for the bridge complete was \$77,000 and the contents of the structure were 9200 cu. yd. of concrete and 100 tons of steel. The bridge was designed by the National Bridge Company of Indianapolis and was erected by the National Concrete Company.

ACCIDENT REDUCTION BY CONTROLLER REGULATORS

In a recent investigation to determine the effect on current consumption, if any, of controller regulators of various types, it was found that an advantage in no way related to the question of current consumption had been experienced by a number of roads. This consisted in a reduction in the number of those accidents which are caused by cars starting suddenly and with a jerk sufficient to throw passengers off their feet; that is, the slow acceleration that tends to lessen the damages to motors and electrical equipment also reduces those for personal injuries. Thus one company in the Middle West which has controller regulators on all of its cars estimates that their use has brought about a reduction of 75 per cent in accidents of this character. Another company in the South has frequently demonstrated to claimants and their attorneys the impossibility of making a jerky start with cars equipped with regulators, and in this way has prevented many fraudulent cases from ever coming to trial. These devices have been found to prevent in some cases still another form of accident. They act as a check in making a sudden reverse in emergencies, and tend to hold the controller handle on the first or second point when the motorman in his excitement would try to throw the handle all the way around. In reversing to stop the car the first or second point produces more retardation than the last point and with less danger of damage to the motors.

ANNUAL CONVENTION, MAINTENANCE OF WAY ASSOCIATION

The tenth annual convention of the American Railway Engineering & Maintenance of Way Association was held at Chicago on March 16, 17 and 18. William McNab, principal assistant engineer, Grand Trunk Railway, president of the association, presided. The following officers were elected for the ensuing year:

President, William McNab, principal assistant engineer, Grand Trunk.

First vice-president, L. C. Fritch, consulting engineer, Illinois Central.

Second vice-president, W. C. Cushing, chief engineer maintenance of way, Pennsylvania lines, Southwest system. Secretary, E. H. Fritch.

Treasurer, W. S. Dawley, chief engineer, Missouri & North Arkansas.

Members of board of directors, three years each, A. H. Rudd, signal engineer, Pennsylvania Railroad, and A. W. Thompson, chief engineer maintenance of way, Baltimore & Ohio.

The attendance at this convention (1335) was the largest in the history of the association. A large and interesting exhibition of railway appliances used in railway construction and maintenance was held during the week at the Coliseum, where there were displays by about 140 exhibitors. At the annual meeting of the Road & Track Supply Association, under the auspices of which the exhibition was held, the following officers were elected to serve during the ensuing year:

President, W. F. Schleiter, Dilworth, Porter & Company, Ltd., Pittsburg, Pa.

Vice-President, T. W. Snow, Otto Gas Engine Works, Chicago.

Secretary and treasurer, John N. Reynolds, western manager, *Railroad Age Gazette*, 160 Harrison Street, Chicago.

Executive committee, John McKinnon, Kalamazoo Railway Supply Company, Kalamazoo, Mich.; George Stanton, Cleveland Frog & Crossing Company, Cleveland, Ohio; Robert E. Belknap, Pennsylvania Steel Company and Maryland Steel Company, Chicago; John W. Duntley, president, Duntley Manufacturing Company, Chicago; A. P. Van Schaick, president, W. K. Kenly Company, Chicago; Azel Ames, Kerite Insulated Wire & Cable Company, New York.

An abstract of those parts of the proceedings which are of interest to electric railway officers follows:

SIGNALING, RAILS AND WHEELS

The committee on signaling and interlocking presented a report of 166 pages, including sample agreements between roads mutually maintaining interlockers and complete mechanical interlocking specifications.

The principal work of the committee on rails during the past year has been the investigation of the breakage and failure of rails and the drawing of conclusions therefrom; the preparation of reports on the results obtained from the use of open hearth steel rails and on changes in specifications for Bessemer steel rails. The committee urged that the various railway companies furnish it with the most complete information possible regarding rail failures, and recommended the use of rail statistic blanks earlier approved.

A sub-committee on the allowable length of flat spots on car wheels continued investigations relating to injury to bridges and railway structures caused by flat spots on wheels.

TRACK

The recommendations of the committee on track were:

(1) That the clear width of standard flangeway for all

frögs and between main rails and guard rails be $1\frac{3}{4}$ in., measured at the gage line, for all tracks of standard gage.

(2) Wide gage, due to worn rail, within the safe limits of wear, need not be corrected until the excess over the gage is equal to or exceeds $\frac{1}{2}$ in., and should then be corrected by closing in.

(3) Within proper limits, a slight variation of the gage from standard is not seriously objectionable, provided the variation is uniform and constant over long distances. Under ordinary conditions it is not necessary to regage track if the increase in gage has not amounted to more than $\frac{1}{2}$ in., provided such increase is uniform.

The committee also asked for an expression of opinion from the association as to which of the three following definitions and formulas should be adopted:

(1) Degree-of-curve is the angle subtended by a 100-ft. chord. Formula, $R = 50 \operatorname{cosec} \frac{1}{2} D$.

(2) Degree-of-curve is the central angle of an arc whose length is 100.0074 ft. and is equal to 5730 ft. divided by the radius. Formula, $R = \frac{5730}{D}$

(3) Degree-of-curve is the central angle of a 100-ft. arc. Formula, $R = \frac{5729.58}{D}$

Definition No. 1 was approved by the association.

TIES

The committee on ties submitted blank forms to be used by roads in supplying the association with statistics of cross-tie data regarding renewal, kind of wood, life and treatment results. The conclusions presented by the report were adopted, as follows:

- (1) Use chemically treated ties wherever practicable.
- (2) Protect such treated ties against mechanical wear by means of tie plates, screw-spikes, etc.
- (3) Enforce the tie specifications rigidly with particular reference to the rigid exclusion of small ties.
- (4) Co-operation among the roads in any given territory, looking toward the adoption of standard tie specifications, with particular reference to making it impossible for contractors to furnish ties cut from small trees, which would naturally form sources for future tie supplies.
- (5) Adopt measures for reducing forest fires.
- (6) Encourage the owners to re-forest their lands either by replanting or natural reproduction.
- (7) Use the proper means to aid and assist in the investigation of tax laws as far as they pertain to forest lands, with a view to having legislation enacted which would make it possible to hold lands with growing timber for the purpose of future tie production.

A sub-committee on metal and composite ties presented a profusely illustrated report outlining the practice and results obtained on steam roads with using steel, combined wood and steel and concrete ties. Its conclusions as adopted follow:

- (1) Experiments with steel ties should be extended, and results carefully watched and reported to the association.
- (2) The committee concludes that no form of reinforced concrete tie has been made which is suitable for heavy and high-speed traffic, but believes a properly reinforced concrete tie, with proper fastenings, may be found economical in places where speed is slow, and where conditions are especially adverse to life of wood or metal.

WOODEN BRIDGES AND BUILDINGS

The work assigned to the committee on wooden bridges and trestles included a revision of the specifications for structural timbers, co-operating with committee O of the American Society for Testing Materials, with a view, if possible, to preparing a uniform standard specification. This committee also was instructed to prepare a list of recommended safe unit stresses for structural timbers; revise the standard names for structural timbers; study the

principles and current practice in pile driving, and report on the best method for classification of pine timbers for structural purposes in place of classification by botanical names.

The committee presented for adoption specifications as revised and adjusted. These specifications comprised appendix A of the report, including general requirements and standards for No. 1 railroad grade long leaf yellow pine and Douglas fir; also No. 2 railroad grade long leaf and short leaf yellow pine and Douglas fir and western hemlock; timber piles of two grades for railroad use and ties and guard rails. Regarding ties and guard timbers for bridges and trestles, the specifications are as follows:

Shall show one face all heart; the other face and two sides shall show not less than 75 per cent heart, measured across the face or side anywhere in the length of the piece; shall be free from knots over $2\frac{1}{2}$ in. in diameter, and where surfaced the remaining rough face shall show all heart.

Appendix B of the report includes six curve sheets, giving a summary of the average results of safe unit stress tests made by the United States Forest Service on full-sized sticks of seven kinds of timbers. To facilitate comparison between average results as represented by the forest service tests, and to indicate the range in some cases, the modulus of rupture, the modulus of elasticity and compression parallel to the grain, according to various authorities, were presented on 11 diagram sheets. Another diagram exhibited the table of ultimate and working unit stresses recommended by the committee and approved by the association. This table is reproduced on page 552.

It is expected that the unit stresses will be revised whenever new results of timber tests are published, or when experience shall indicate that a revision is desirable. The section of the report devoted to piling included definitions for piles and pile-driving materials and machinery, illustrations of wooden and steel-sheet piling, data on driving and a discussion on the prevalent bad practice of overdriving, illustrated by engravings of overdriven piles.

RECORDS

The committee on records, reports and accounts submitted forms for estimates ordinarily handled by the engineer of maintenance of way for track work, and made recommendations as to conventional signs to be used in making track maps.

BALLASTING

The committee on ballasting recommended definitions, which were approved as here presented:

Gravel—Small worn fragments of rock occurring in natural deposits, that will pass through a $2\frac{1}{2}$ -in. ring and be retained on a No. 10 screen.

Sand—Any hard, granular, comminuted rock material finer than gravel, which will pass through a No. 10 screen and be retained on a No. 50 screen.

Accounts were presented outlining methods of handling ballast on various classes of work, including tables of costs and quantities for large plants. The committee outlined the approved methods for stripping, loading and washing gravel, summarized the functions of good ballast and the advantages and disadvantages of various kinds of ballast. Physical tests of ballast stone taken from a large number of quarries were presented.

SIGNS, FENCES, CROSSINGS AND CATTLE GUARDS

It was recommended by the committee on signs, fences and cattle guards, and approved by the association, that the following type of construction be used at grade crossings:

This construction will necessarily vary with conditions, but can be divided into the following general classes:

- (a) Crossings where paving is required to conform to street specifications.
- (b) Crossings of streets where no paving is required.
- (c) Crossings of public roads or highways outside of towns or cities.
- (d) Crossings of private or farm roads.

(1) For crossings where paving is required to conform to street specifications, cross-ties should be treated chemically to prolong their life to the greatest limit possible, and laid on a bed of stone or slag ballast not less than 12 in. in depth, placed in 3-in. layers, each thoroughly rammed, so as to prevent settlement. An 8-in. bed of Portland concrete mixed 1:3:6 can be substituted for the ballast if desired.

With the ballast and outside of the tracks, porous tile drains not less than 6 in. in diameter should be placed at intervals, leading to the nearest point from which efficient drainage can be obtained.

The support of the rail on the ties will vary with the character of paving used.

Where a special rail section is used, the flangeway should be rolled as a part of it.

With vitrified or paving brick, the ties should be similar and have the same foundation as described above, except that with rails of high section the use of the cast chairs is unnecessary.

A heavy tie-plate should be placed on each tie where the ordinary track rail is used.

A strip of treated timber 4 in. x 6 in., fitted to the rail and placed so as to expose 3 in. of surface next to the rail-head, should be used next to the outside rail, and this should be paved against; the strip should be 1/4 in. below the rail-head.

Metal flangeways should be provided as described above, and paved against in like manner.

With asphalt paving a similar construction as for vitrified brick is recommended.

Paving between and outside of the rails should be laid in the most approved and workmanlike manner.

(2) Street crossings where no paving is required should be divided into two classes—those with plank laid the entire width and length, and those with plank only next

TABLE OF ULTIMATE AND SAFE WORKING STRESSES FOR VARIOUS KINDS OF TIMBER

KIND OF TIMBER	BENDING			SHEARING				COMPRESSION						Ratio of Length of Stringer to Depth	
	EXTREME FIBER STRESS		MODULUS OF ELASTICITY	PARALLEL TO GRAIN		LONGITUDINAL SHEAR IN BEAMS		PERPENDICULAR TO GRAIN		PARALLEL TO GRAIN		For Columns Under 15 Diam. Work'g Stress	Formulas For Working Stress in Long Columns Over 15 Diameters		
	Av'ge Ultimate	Work'g Stress		Av'ge Ultimate	Work'g Stress	Av'ge Ultimate	Work'g Stress	Elastic Limit	Work'g Stress	Av'ge Ultimate	Work'g Stress				
Douglas Fir.....	6,100	1,200	1,510,000	690	170	270	110	630	310	3,600	1,200	900	1,200	$\left(1 - \frac{L}{60D}\right)$	10
Longleaf Pine.....	6,500	1,300	1,610,000	720	180	300	120	520	260	3,800	1,300	980	1,300	$\left(1 - \frac{L}{60D}\right)$	10
Shortleaf Pine.....	5,600	1,100	1,480,000	710	170	330	130	340	170	3,400	1,100	830	1,100	$\left(1 - \frac{L}{60D}\right)$	10
White Pine.....	4,400	900	1,130,000	400	100	180	70	290	150	3,000	1,000	750	1,000	$\left(1 - \frac{L}{60D}\right)$	10
Spruce.....	4,800	1,000	1,310,000	600	150	170	70	370	180	3,200	1,100	830	1,100	$\left(1 - \frac{L}{60D}\right)$	..
Norway Pine.....	4,200	800	1,190,000	590	130	250	100	.....	150	2,600*	800	600	800	$\left(1 - \frac{L}{60D}\right)$	..
Tamarack.....	4,000	900	1,220,000	670	170	260	100	.....	220	3,200*	1,000	750	1,000	$\left(1 - \frac{L}{60D}\right)$	..
Western Hemlock.....	5,800	1,100	1,480,000	630	160	270*	100	440	220	3,500	1,200	900	1,200	$\left(1 - \frac{L}{60D}\right)$	..
Redwood.....	5,000	900	800,000	300	80	.....	.....	400	150	3,300	900	680	900	$\left(1 - \frac{L}{60D}\right)$	..
Bald Cypress.....	4,800	900	1,150,000	500	120	.....	.....	340	170	3,900	1,100	830	1,100	$\left(1 - \frac{L}{60D}\right)$	..
Red Cedar.....	4,200	800	860,000	.....	.....	.....	.....	470	230	2,800	900	680	900	$\left(1 - \frac{L}{60D}\right)$	..
White Oak.....	5,700	1,100	1,150,000	840	210	270	110	920	450	3,500	1,300	980	1,300	$\left(1 - \frac{L}{60D}\right)$	12

Note.—These unit stresses are for a green condition of timber and are to be used without increasing the live load stresses for impact. *Partially air-dry. L=length in inches. D=least side in inches.

If stone blocks are used, a substantial cast or malleable steel chair, with a base of not less than 48 sq. in., should be provided, fastened to the tie with suitable lag-screws, the rail fastenings to be a hook-headed bolt secured with nuts. Ties should be spaced so as to allow the joints to be supported by these chairs.

On long stretches of track laid in streets paved with stone blocks the use of a special rail section, not less than 9 in. in depth, is advisable, to avoid the use of the chairs mentioned; with such a rail heavy tie plates should be used as a protection.

On the outside of the rail the block paving should be laid up to the rail-head, but left slightly below it on the inside. An old rail or a suitable form of rolled filler should be placed to provide a flangeway, this to be fitted into the space between the head and base of the track rail; if an old rail is used the flange should be placed as nearly vertical as possible, the paving between the rails to be limited by the flanges or fillers. The flangeway should be supported by the same chairs carrying the track rail, with a clear opening of not less than 2 in

the rails and at the ends and filled between with suitable material.

For the first style, the plank should be of such timber as can be most economically obtained, not less than 3 in. in thickness, the outside planks to be shimmed, so as to be 1/4 in. below the rail-head, and those inside similarly shimmed when necessary.

An old rail laid on the side of some suitable form of rolled metal shape should be used as a flangeway, its ends to be slightly bent inward, so as to give an opening of not less than 4 in. at the ends, the flangeway through the balance of the crossing to be not less than 2 in.

The intermediate planking should be closely fitted to the base of the old rails or other metal forming the flangeway, so as to avoid the necessity of further securing them to the ties.

For fastening the planking to the ties, 3/8-in. x 8-in. cut spikes should be used for rails 5 in. in height and under.

The ends of the planking should be beveled both between and outside the rails to a thickness of 1 in., commencing at a point 10 in. from the end.

One plank not less than 10 in. in width should be used on the outside of the track rails, and the total length of the planking should conform to the required street width.

Concrete, slag or other suitable material should be used from the plank outside of the rails to such distance necessary to properly complete the crossing.

Where the requirements do not call for continuous planking over the tracks, one plank should be placed each side of each rail, with the flangeway rails or metal shapes as described above and similar in other details, with the exception that a filling of concrete, slag, gravel or other suitable material should be used between the planks, the material to be filled in level with the top of the planking after a thorough compacting.

In the description of street crossings for cities and towns no limits as to approach grades are given, such physical characteristics being governed by local laws and conditions. The width of the street crossings are also governed by local requirements.

(3) For public roads and highways outside of towns and cities, the crossing construction should be similar to that described for streets which have the minimum amount of planking and ballast filling between them. Such crossings should be level for a distance of 5 ft. on each side of the outside planks; on a fill the approach grade should not exceed 6 per cent.

Where the crossings are in a cut, ditch drainage should be provided for by the use of terra cotta pipe where feasible, but if the volume of water is too great, box cul-

vision should be made for delivery to storage tanks from barrels by pipes through the floor.

(4) The delivery system from the storage tanks to the faucets should be such that the oil can be delivered quickly and measured; the delivery should also be such that there will be a minimum of dripping at the faucet and that the drippings be drained back to the storage tanks.

ROADWAY

The committee on roadway presented a report dealing with track elevation and depression inside of cities and grade and curve improvement work outside of cities, and submitted recommendations covering more particularly questions of detail relating to handling the work.

MASONRY

Included in the report of the committee on masonry were specifications for Portland cement concrete and reinforced concrete, together with specifications for the steel reinforcement and the preparation of placing the mortar and concrete.

ELECTRICITY

S. E. Coombs, New York Central, chairman of the committee on electricity, said that this committee, with two exceptions, was the special advisory committee appointed to report upon the propriety of establishing a standing committee. The standing committee has been appointed and will soon begin work.

The committee on electricity appointed for the ensuing year follows:

Geo. W. Kittredge, chairman, chief engineer, New York Central.

J. B. Austin, Jr., vice-chairman, engineer maintenance of way, Long Island.

A. S. Baldwin, chief engineer, Illinois Central.

R. D. Coombs, structural engineer, Pennsylvania Tunnel & Terminal.

E. P. Dawley, engineer of construction, New York, New Haven & Hartford.

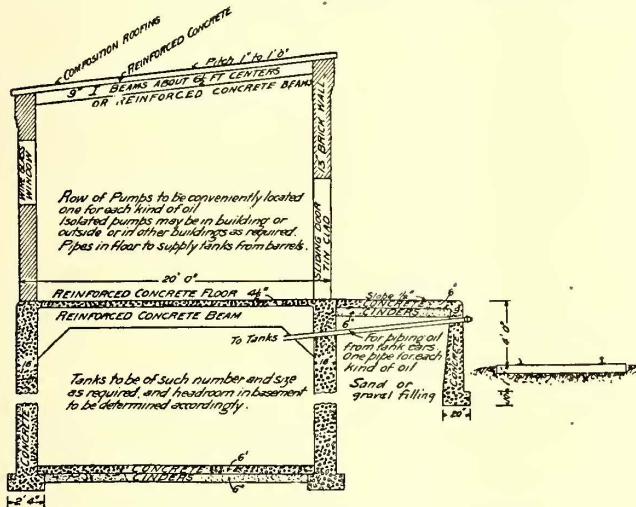
L. C. Fritch, consulting engineer, Illinois Central.

G. A. Harwood, chief engineer electric zone improvements, New York Central.

W. W. Drinker, assistant engineer, Erie.

C. E. Lindsay, division engineer, New York Central.

H. R. Talcott, engineer surveys, Baltimore & Ohio.



Recommended Design of Fireproof Oil House

verts or bridges of similar width to the crossing should be provided.

The width of highway crossings should be not less than 16 ft.

(4) Crossings of farm or private roads should be constructed by filling with ballast or other suitable material level with the rail-head, on the outside and inside, leaving a proper flangeway inside the rails. Such crossings should be level for not less than 3 ft. each side of the rails, and the approach grades should not exceed 8 per cent.

In cuts, proper provision should be made for drainage as for highway crossings.

The width of farm or private road crossings should be not less than 12 ft.

BUILDINGS

The committee on buildings presented a report on round-house and oil-house construction. A recommended design of oil-house construction is illustrated.

The conclusions of the committee as adopted follow:

(1) When practicable, oil houses should be isolated from the other buildings at a terminal.

(2) Oil houses should be fireproof, and the storage in large houses should preferably be either underground or in the basement.

(3) Oils that are stored in sufficient quantities should be delivered to the tanks in the house direct from tank cars; for oils that are stored only in small quantities pro-

THE LOOSE LEAF FILING SYSTEM OF MATTERS IN PERIODICALS

An interesting paper on this subject was read March 25 at the Cleveland meeting of the Central Electric Railway Association by Robert N. Hemming, assistant superintendent, Ohio & Southern Traction Company, Columbus, Ohio. The first part of Mr. Hemming's paper was devoted to an argument in favor of indexing by subjects the articles relating to the different topics connected with electric railway construction and operation. In the plan followed by him a sub-classification by companies is also employed. The index saves the trouble of going over all the pages to obtain a particular item desired and also assembles all the information on the practices of different companies and even of the manufacturers of any particular line of apparatus. Whether the company whose practice is described has perfected a piece of apparatus or not, knowledge of its success or failure is equally important to another company which may be considering its adoption.

A very important kind of items to classify are those relating to the legal decisions on accident claims. Most of the technical papers give considerable space to this information. If these decisions are so arranged that the information is readily available, it may be found to be of great

assistance to the management and the attorneys of the company. Without some systematic method of filing these decisions the company would be, in many instances, ignorant of suits and claims which have been decided on by the courts and which bear a close resemblance to the cases in which it may be at the time engaged. Another direction in which the filing system can be of great value is in keeping records of the financial reports made by other companies. By comparing these reports with those of one's own company, especially the details of expenses, valuable suggestions could often be obtained.

Mr. Hemming described his plan for filing articles which can be carried on with magazines of the usual form, but the speaker thought that if the magazines were published in a different form it would be more convenient. He suggested that the leaves be separated and the folios held together by inserting in punched holes in the margin two substantial stay clips which could be easily removed without injury to any part of the book. This would make it possible for those who desired to retain the book in its present form to do so, but those who wished to file the sheets separately would only have to remove the clips. He also suggested that the date, volume and page be printed upon each sheet and that a place at the top of the page be reserved for the section number, alphabetical indices and other memoranda. The pages could then be filed in a loose-leaf ledger binder with adjustable posts. He said:

This may seem like an expensive cover to apply to these periodicals, but through this systematic means of filing we might be able in some one instance to obtain information that would be the cause of saving the cost of 100 such binders. On account of the manner in which we now take care of our periodicals, we obtain little or no value from them. While some of us make it our business thoroughly to digest the news that is published in them, others will merely glance at them and cast them in the waste basket. How desirable it would be to turn back at any time and obtain all of the news published on one subject through the current year. Many times this information which is handed down to us through these periodicals is just the matter which we are seeking. In some cases it is technical, but in most cases it is derived from practical demonstration, tests and operation. Further than that, we are able to make comparisons on these subjects with the various railroads scattered throughout the country. Two roads, one on the Atlantic Coast and one on the Pacific Coast, might be experimenting along the same line and the desire of both might be to accomplish the same thing. Neither would perhaps know anything of what the other was doing, nor the balance of the roads lying between, but through the various periodicals which are published we are kept in touch with the operations of the entire country. Why, then, should we not value this information to a higher degree than we now treat it and care for it?

The few periodicals which I have embodied in this book for demonstration have already shown me what a valuable thing it could be made to be. As I began to file them by subjects I read with interest a great many pages bearing on the same topics and these articles were gathered from the four corners of the globe. Had I not brought these periodicals together I would not have known, perhaps, that these things ever transpired.

Mr. Hemming thought there were several ways in which advertising pages could be arranged without lessening the value of the paper as an advertising medium. One was for the railway companies to classify the advertisements and preserve them temporarily in binders in the way suggested for the reading pages. He doubted whether advertisements more than 30 days old were of much value except from an historical standpoint. Mr. Hemming had with him at the convention a copy of his file to illustrate his method of filing articles.

HEARING ON MILWAUKEE FARE CASE BY WISCONSIN RAILROAD COMMISSION

Supplementing the testimony before the Railroad Commission of Wisconsin in the Milwaukee fare case, published in previous issues of the *ELECTRIC RAILWAY JOURNAL*, additional evidence on behalf of the Milwaukee Electric Railway & Light Company has been presented by C. N. Duffy, comptroller, and Edwin W. Olds, superintendent of rolling stock. Abstracts of the testimony of Mr. Olds and Mr. Duffy follow:

ADDITIONAL TESTIMONY OF MR. DUFFY

Upon taking the stand on March 11 Mr. Duffy was asked by Edwin S. Mack, of counsel for the company, to define depreciation. He read part of a paper presented by him in January, 1908, before the Northwestern Electrical Association, defining depreciation and discussing the results thereof. In his judgment, it was not practicable to set aside funds to provide for depreciation in any other way than by the installment plan. To provide a depreciation reserve fund on this plan involved nothing more than charging the amounts based on the proportionate life of the physical property used in the operation of the railway. This charge should be made periodically, preferably monthly, but at least annually, in equal apportionments unless the income from the operation of the property would result in a deficit by reason of such charge. In this event it would be presumed that the charges could be dealt with in such a way that the "lean" years would stand only part of the charge and the "fat" years would stand such additional proportion as to equalize the "lean" years.

The installment plan was in accordance with the Wisconsin public utilities law, which provided in addition that if the depreciation fund should be invested the income on such investment should also be carried in the fund.

Mr. Duffy explained what he meant by "lean" and "fat" years. A street railway on beginning operation frequently required a number of years before it could take care of operating expenses and interest charges out of earnings. That would preclude the possibility of setting aside anything for a depreciation fund. Assuming that the life of the property of a street railway company, valued at \$1,000,000, was computed, in the light of the experience of the past, after careful analysis of the different classes of property and the lives thereof, conditions of use, etc., at 15 years, the probabilities were that for the first five years of operation there would be comparatively little that could be taken out of earnings for a depreciation fund. The ideal way would be to charge against earnings each year one-fifteenth of the value of the property, setting this amount aside annually. The principal difficulty would be that in the past five years, and possibly within other years during the time, the results of operation would leave nothing to be set aside. It would be a question of the ability of the earnings to make up 100 per cent within the period required, including "lean" as well as "fat" years, in order to keep the property in the necessary condition of physical efficiency. Mr. Duffy stated his objections to the sinking-fund method of providing for depreciation, presenting the theory of A. C. Humphreys, of the American Gas Institute. These objections Mr. Duffy stated as follows:

OBJECTIONS TO SINKING-FUND METHOD

1. The complications arising from the fallacy in the application of the sinking-fund method of calculating the sinking-fund requirements as one annual sum charged on the average life of the plant. A company, having \$1,000,000 of property with a life of 10 years and \$1,000,000 of prop-

erty with a life of 30 years, would have \$2,000,000 of property with an average life of 20 years. According to Inwood's tables, the sinking-fund requirements at 5 per cent per annum (and a return of 5 per cent per annum on such an investment would be doubtful) necessary to replace the \$1,000,000 of property in 10 years would entail a charge of \$79,505 per annum, and to replace the \$1,000,000 of property in 30 years an annual charge of \$15,051 per annum, making a total of \$94,556, whereas the sinking-fund requirements necessary to replace \$2,000,000 of property in 20 years would be only \$60,486. Consequently the sinking-fund requirements as provided would fall short of the amount needed by approximately 36 per cent.

2. If the sinking-fund requirement was calculated on the estimated lives of the different classes of property making up the plant, the same complication arose, although to a less extent. An estimate that a car would run an average of 20 years would not mean that every car would run 20 years, but that some would last more and some less than that time. The sinking-fund requirements would be built up on the theory that the 100 cars would be replaced in 20 years and would not therefore be adequate to provide for the replacement of the 100 cars at the rate of, say, 20 cars in the sixteenth year, 20 cars in the eighteenth year, 20 cars in the twentieth year, 20 cars in the twenty-second year and 20 cars in the twenty-fourth year, although the average life of the 20 cars would be 20 years.

3. Sinking funds are subject to the uncertainty that the rate of earnings assumed in calculating the actual requirements may be less than the actual amount earned.

4. Sinking fund requirements are based on the assumption that the income from the operation of the property will be sufficient to enable the annual sinking-fund provisions to be made regardless of "lean" or "fat" years.

RESERVE FOR TAXES

When the hearing was resumed on the afternoon of March 11 the direct examination of Mr. Duffy was continued by Mr. Mack, who asked about the reserve for taxes, which had been criticised as excessive. Prior to 1908 the Milwaukee companies paid 5 per cent of the gross earnings for their operative property and an ad valorem tax for the non-operative property. The custom was to charge 6 per cent of the gross earnings annually to take care of both taxes. The criticism of the city accountants was that this percentage was more than had been actually paid, which Mr. Duffy believed was true according to the figures of the accountants and the books of the company. At the same time the reserve for taxes was built up on the principles and for the same reasons as the other reserves of the company. The tax situation in 1908, the first year that the ad valorem tax became operative, resulted in a charge to both companies of something like \$300,000, which was an increase of about \$70,000 or in round figures 30 per cent. Then there were in addition the taxes on the non-operative property, which, with the cost of paving, sewer improvements and other expenses of that nature, aggregated, as Mr. Duffy recalled the figures for 1908, \$15,000 additional. The effect was that the reserve for taxes, which the city accountants said had been charged more heavily against earnings than was warranted, was very nearly exhausted. The surplus, which had been accumulating through prior years because of the policy of charging 6 per cent on the gross earnings tax and the ad valorem tax on the non-operative property, was very nearly exhausted by the taxes for the one year 1908. In 1909 the company was reserving 7 per cent. In 1908, Mr. Duffy thought, the taxes were about 6.7 per cent of the earnings in addition to the \$15,000 for other taxes on non-operative property.

LENGTH OF POSSIBLE RIDE

A question was asked about the advantage to the public arising from the consolidation of the various street rail-

way properties in the city. Mr. Duffy emphasized the length of the ride. In 1890 the length of ride possible was 4.25 miles; in 1896 it was 9.25 miles; it was possible now to ride 11.21 miles for one 4-cent ticket. The increased transportation facilities made it possible to carry passengers from one part of the city to another by a continuous ride in the most direct way for one fare with the universal transfer system, contrasting with five companies and seven lines and practically seven 5-cent fares before the consolidation.

There existed in Milwaukee with the present company 14 separate initial lines. To ride on each one of these lines and continue the journey with the use of a free transfer to the farthest possible point would make a total ride of about 128.13 miles or an average ride over the 14 lines of approximately 9 miles. Cars must be operated over the 14 lines, furnishing the long rides regardless of the average length of ride per passenger and whether there were passengers to be carried or not. The Milwaukee company did not have what was found in some other cities—a valuable short-haul traffic.

MILWAUKEE AND GLASGOW

A comparison of the results of operation of the Glasgow Corporation Tramways for the year ended May 31, 1908, and the operations in Milwaukee was made by Mr. Duffy. The average fare per mile in Glasgow was forty-five-hundredths of a penny or 0.9 cent. In other words, the average rate of fare charged per mile by the Glasgow Corporation Tramways was double the rate in Milwaukee, and the rate of wages paid the Glasgow employees was about one-half the rate paid the employees in Milwaukee. The following additional statistics were presented:

Population: Glasgow, 1,500,000; Milwaukee, 350,000.

Miles of revenue single track operated: Glasgow, 178; Milwaukee, 119.

Average number of cars operated daily, based on 14 hours per car per day: Glasgow, 548; Milwaukee, 270.

Revenue passengers carried: Glasgow, 226,948,290; Milwaukee, 74,720,783.

Glasgow, with three times the population of Milwaukee, had only 50 per cent more trackage than Milwaukee and operated only twice as many cars as Milwaukee, but carried three times as many revenue passengers. The trackage of Glasgow showed clearly the congestion of population. The number of cars operated showed that the cars in Glasgow carried approximately 45 per cent more passengers per car than the cars in Milwaukee, independent of the difference in size and type. The Glasgow cars, Mr. Duffy understood, were small single-truck cars of the double-deck type, the carrying capacity of which was approximately only 50 per cent of the carrying capacity of the Milwaukee cars.

ELEMENTS GOVERNING RATE OF RETURN

Responding to a question asked by Mr. Mack regarding the elements necessary to consider in fixing a rate of return on the investment Mr. Duffy said that organization and management, with ability to conceive and achieve and to accomplish the results sought to be attained, constituted elements which should enter into the question of what should form the basis of return on the investment that produced the service.

The character of the service as to transportation facilities and the benefits of consolidation of the different lines should be considered.

Another element was the discipline of conductors and motormen. The cost of injuries and damages was much less in Milwaukee than in any other city of corresponding

size as to population or system and very much less than in the larger cities. This relative freedom from accident meant that the lives and limbs of passengers were in less jeopardy than they would be without the existing facilities. The efficiency of the operation of the cars and operation of the power station, making the service as reliable as was practicable with human effort, should enter into a calculation of the fair amount of return on the investment required to provide the service.

Quotations were read by Mr. Duffy from a report made by Commissioner Milo R. Maltbie to the New York Public Service Commission, First District, stating that the exercise of care, economy and ingenuity in operation and good judgment in the selection of employees on the part of corporations should be encouraged and that enterprise and thrift should be rewarded.

Referring to this statement, Mr. Duffy, in discussing further the efficiency of the management of the Milwaukee property, spoke of the relations between the company and the employees. There had been no labor trouble since Mr. Beggs had been president and general manager of the company. Everything that was consistent and practicable for the benefit of the employees was done and the officials felt that the employees gave their loyal support to the work of the company. Reference was made by the witness to the practice of the company, mentioned by Mr. Beggs in his testimony, of loaning money to employees who were in need of funds because of sickness or death in the family. In the cashier's office there were due bills of employees of the company aggregating over \$1,000, ranging from \$50 to \$150 in amount. One man to whom the company advanced \$150 was paying it back at the rate of \$2.50 each pay day. That was an element of good management which should be reckoned with.

ELEMENT OF GOING COST

Supplementing the testimony given by Prof. M. E. Cooley, stating that the element of going cost should be taken into consideration in making a valuation of a business, Mr. Duffy gave figures showing the results of operation of the Milwaukee Central Heating Company from the time its operations started up to the close of the year 1908. Objection was raised by Lester C. Manson, counsel for the city, to the introduction of this testimony. Mr. Mack, of counsel for the company, said that he did not pretend that the results of operations of the heating company in the years 1906 to 1908 were necessarily similar to those of a

MILWAUKEE CENTRAL HEATING COMPANY, EARNINGS AND EXPENSES, 1906, 1907, 1908.

Statement Submitted by C. N. Duffy, Comptroller, to Illustrate Going Cost, or Expenses During Initial Period of Development of Business, Constituting Part of the Cost of the Property.

	Year 1908.	Year 1907.	Oct. 1-Dec. 31, 1906.
Gross earnings.....	\$48,249.86	\$27,314.66	\$7,719.91
Operating expenses.....	42,286.58	28,720.27	8,947.56
Taxes	8,400.00	7,506.90	.....
Depreciation .....	.....	.....	.....
Net earnings.....	.....	.....	.....
Deficit	2,436.72	8,912.51	1,227.65
Cost of property close of year.....	700,855.00	652,431.85	326,496.35
Capitalization close of year.....	500,000.00	500,000.00	.....

street railway company in the years 1890 to 1908, but when Professor Cooley made his demonstration showing how long a time a company might be in operation before it could be a successful enterprise the attorneys were anxious to obtain the history of some company which could be traced back to the beginning of its operations, disclosing exactly what had been spent to establish the business. After a search it was found that the only company to the figures of which access could be had was the Milwaukee

Central Heating Company. As the purpose was simply to illustrate the principles laid down, Halford Erickson, member of the commission, said that the statement would be received. This statement is published herewith.

Explaining the statement of the Milwaukee Central Heating Company, Mr. Duffy said that the deficits shown represented simply subtraction of the operating expenses and taxes from the gross earnings, without provision for depreciation of any character, wear and tear, obsolescence, supersession, or any charge of that nature, and that the heating company participated in the advantages of the unified organization. The heating company paid the Milwaukee Electric Railway & Light Company 35 cents per 1000 lb. for steam. This price was fixed with the idea that the heating company should pay the Milwaukee Electric Railway & Lighting Company for depreciation of the property and interest on the investment. The price was regarded as equitable with due consideration of all the elements involved and taking into account what had been done under similar circumstances in St. Louis and Detroit and with other companies in which the North American Company had an interest.

The property of the heating company was constructed by the Milwaukee Electric Railway & Light Company under a work order. During the construction period the Milwaukee Electric Railway & Light Company furnished the capital required, having to borrow it most of the time, and the interest on the labor and material furnished and the work performed incident to construction of the property was charged to the heating company by the Milwaukee Electric Railway & Light Company. Beginning Oct. 1, 1906, when the heating company began operation, as construction progressed the interest on the work done was charged against operation. To charge interest against operation during the construction of property is the policy pursued by the Milwaukee Electric Railway & Light Company and the Milwaukee Light, Heat & Traction Company. It would be entirely justifiable to charge to construction account the interest on the cost of construction up to the time the property began to produce revenue, but as a matter of conservatism the Milwaukee companies had not done so.

INTEREST DURING CONSTRUCTION

It was estimated by Mr. Duffy that a proper charge for interest during the construction of the entire property of the Milwaukee Electric Railway & Light Company would be 9 per cent. This figure was based on an assumed construction period of three years. To show the time required frequently to complete construction work, Mr. Duffy referred to several work orders indicating various costs and delays in construction. The work order for the Public Service Building was dated Dec. 19, 1902; the building was occupied and used in its entirety about June 1, 1906, or about three and one-half years after the date of the order. Up to the date there had been expended \$1,531,344.67. A work order was closed only when all the work had been completed and in this case the work order was not closed until April 30, 1908, making a period of nearly five and one-half years. The figures of cost as of April 30, 1908, were \$1,926,567.12.

DISCOUNT ON BONDS

The subject of discount on bonds was then discussed by Mr. Duffy. He said that discounts and commissions on securities issued for construction purposes or to raise funds for construction were properly capital expenditures, as were other expenses incurred in connection with financing properties, as such expenses represented the cost of pro-

curing the money and were as much a cost of the property as any other expenditure made in connection therewith.

This principle was sound and correct from an accounting standpoint, just so far as the public was concerned, equitable from the standpoint of investors, and a vital question that must be dealt with in financing public-utility properties.

Under the laws of the State of Wisconsin bonds issued under the authority of the Railroad Commission may be sold at a discount, not more than 25 per cent, which was a recognition of the principle laid down that discount on bonds was a part of the cost of properties, constructed or acquired.

Discount on bonds was treated as a capital expenditure, carried into cost of road and equipment under the old Interstate Commerce Commission classification of accounts as applied to steam railways. The standard system of electric railway accounting of the American Street & Interurban Railway Accountants' Association formulated in 1897, officially adopted by the association in 1898 and adopted by the National Association of Railway Commissioners in 1899, also treated discount on bonds as a capital expenditure. The new Interstate Commerce Commission classification of accounts for steam railways, as well as the Interstate Commerce Commission classification of accounts for electric railways, did not treat discount on bonds as a capital expenditure.

The American Street & Interurban Railway Accountants' Association, at its last convention held in Atlantic City in October, 1908, officially adopted the Interstate Commerce Commission classification of accounts for electric railways as the standard for the American Street & Interurban Railway Association, with this exception: "Discounts and commissions on securities issued for construction purposes or to raise funds for construction should be considered a proper capital expenditure and therefore be charged to expenditures for road and equipment."

From this it would appear, Mr. Duffy said, that in so far as the Milwaukee Electric Railway & Light Company was concerned, the city's accountants had neither authority, warrant nor right to exclude from cost of the property the item of discount on bonds.

Responding to a question by Mr. Curtis, Mr. Duffy said it had been his uniform practice as auditor and comptroller to include discount on bonds as cost of capital and property. Electric railway properties could not have been financed without selling bonds at a discount or offering some other kind of an inducement to lead capitalists to invest money in a hazardous business. Attention was called by Mr. Duffy to the provision of the ordinance passed by the City of Chicago allowing the Chicago City Railway and the Chicago Railways Company 10 per cent on the actual cost of rehabilitation as a fair and proper allowance for conducting the work and furnishing the equipment and 5 per cent for services in procuring funds, including brokerage. Discussing the disposition of bond discount in the reports of the accounts for the said company, Mr. Duffy said that so far as the net earnings of the property were concerned it was practically immaterial whether the bond discount was charged to capital account or set up as an item of expense and written off during the life of the bond.

THE INVESTOR A PARTY IN INTEREST

The point of view of the investor whose earnings were placed in the property was discussed by Mr. Duffy. He said that it seemed to him that there were three parties in interest who should be considered. First, there was the

public that required and should be furnished proper transportation facilities; second, there was the corporation whose duty it was to furnish the necessary facilities; third, there was the investor who advanced the money that made it possible for the public to have the facilities and for the corporation to furnish the facilities. In all of the problems of this nature it had been generally considered that there were only two parties in interest—the company and the public which made use of the facilities. The investor was a very important element.

Mr. Duffy showed what had happened to the Chicago City Railway after its claim to a 99-year franchise had been denied by the United States Supreme Court and to the New York City Railway system in New York. In speaking of the New York situation Mr. Duffy said that through the unreasonable transfer requirements by legislative enactments, the 5-cent fare had been reduced to approximately 3 1/5 cents. This condition, together with the enormous increase in taxes, including the "special-franchise tax"; the congestion of streets, resulting in increased cost of operation; injuries and damages, requiring about 10 per cent of the gross earnings, and the competition of the subway, built with the aid of the credit of the City of New York, were the reasons given for the receivership of this property, representing a capitalization of approximately \$240,000,000, 83 per cent of which, it was claimed, represented cash or property.

The situation in Cleveland was also discussed by Mr. Duffy. In a prospectus of the Forest City Railway, issued in July, 1906, the capitalization and construction cost of the property had been mentioned as \$50,000 per mile of track. The cost of the Forest City Railway on May 31, 1907, without land or buildings for power plant, without concrete foundation under tracks, with rails that were largely seconds and with ties that were partly culls and approximately 25 per cent of the car equipment second-hand trailers that were formerly the property of the Nassau Electric Railway, of Brooklyn, the cost was about \$72,000 per mile of track. The published report of the operations of the Forest City Railway for the quarter ended June 30, 1907, showed net earnings of \$3,774.19. As corrected by an eminent accountant, the report showed a deficit of \$17,457.22.

Continuing, Mr. Duffy said that the average annual return on the investment in the Milwaukee properties had been anywhere from as much as 5.92 per cent to as little as 4.37 per cent, depending on how it was figured.

TESTIMONY OF EDWIN W. OLDS

Edwin W. Olds, superintendent of rolling stock of the Milwaukee Electric Railway & Light Company, testified on March 12. He said that an allowance of about 7 1/2 per cent per annum should be made for depreciation due to age and wear on car bodies and trucks. If the two classes of equipment were separated the allowance should be about 8 per cent for car bodies and about 4 per cent for trucks. The following other allowances for depreciation due to wear and tear were recommended:

	Per cent
Electrical equipment	6
Fenders, headlights, clocks, etc.....	10
Car and car equipment.....	6 3/4
Buildings	3
Office furniture and fixtures	5
Shop tools and machinery.....	7 1/2

The allowance for depreciation of electrical equipment due to age and wear was figured at the percentage stated

because the expense resulting from rapid wear and replacement of parts was charged to maintenance. The same practice was followed with trucks; a pair of wheels or a wheel would wear out in about 10 months' actual service. Practically all of the upkeep of motors, trucks and cars was charged to maintenance; the depreciation, as treated by Mr. Olds, was intended to take care really of the life of the car.

In order to store the larger types of cars the company had been obliged to make extensive alterations in car houses as the changes in cars took place.

Radical changes had been made in car construction within the last few years. The speaker mentioned the pay-as-you-enter development, the increase in size of the car and the use of steel in the construction. The general design had also been changed. In cars which are being constructed for Chicago the original plans provided that the windows should drop down into the side pocket or channel. In the latest Milwaukee cars the sash are raised, making a more substantial, sanitary and satisfactory car, and the Chicago plans have been modified to introduce this method. Motors and trucks were also passing through a stage of improvement that was radical. Exhibits were submitted by Mr. Olds of pictures of obsolete equipment.

During the cross-examination, Lester C. Manson, assistant city attorney, asked Mr. Olds where the line was drawn between charges to maintenance and to depreciation reserve. As an illustration, the witness said that if new equipment purchased was strictly an addition to the property it would be charged to property account; if it was not it would be charged to depreciation. When motor service were rewound, cars painted, car bodies and trucks repaired, wheels and axles replaced, etc., the expense was charged to maintenance. Mr. Olds referred to some cars that were purchased in 1896, subsequently rebuilt and then continued in regular service up to three or four years ago. The cost of maintenance then became excessive, and the cars were retired from all-day service and used only for extra trips or when one of the later types of cars had been temporarily disabled. To rebuild the car bodies at the time they were retired from all-day service would have cost from \$500 to \$1,000 apiece, but it would not have been good business to have expended the amount of money that would have been required. The cars could be maintained at comparatively small expense for the service of one or two hours a day, and while the value of the cars was small, they would help out for the extra service without putting the company to the expense of investing in more modern cars for that service. The line must be drawn at some point in the life of the cars when they should be scrapped or sold to a small company. The link pin of a wagon could be taken and a new wagon built around it; a screw could be taken from a car and used in a new car, but in order to use the parts of the old car that could be saved it would be necessary to build the new car from the same design as the old, and, although a good car, it would be out of date and practically obsolete after it had been rebuilt. Cars were not built like the one-horse shay; the parts did not all wear out at one time.

In ordering new cars Mr. Olds' motto had always been that the best was not good enough. At the present time the company had under consideration the construction of cars for city service that would be a departure from any type yet produced. The cars would have steel underframing, with the construction simplified so as to make them more satisfactory for operation and the general use

of the public. The steel would extend to the bottom of the window sash.

The experience of the speaker had been that while a better motor was secured now than in the past, it was subject to increased service, more rapid acceleration, and consequently greater electrical strain, hence the actual maintenance cost had not been reduced to the extent that many had hoped would be the case. The average life of axles was from two to five years.

Mr. Olds named the years in which the cars now in service were purchased. Twenty cars purchased in 1896 had not been in regular service for about four years; they were practically obsolete and had depreciated to such an extent that repairs were excessive. These cars made one or two trips at night. The single-truck cars originally owned by the company had been sold from time to time for summer kitchens and playhouses, while a number were purchased by roads in smaller towns; at present about 20 of these small cars were owned by the company, but, with the exception of a few which had been converted to line cars, work cars, hand cars, etc., they were not used for any purpose. When the operation of electric railways was first started a complete car of this description cost about \$4,000. That price was reduced as the art advanced, so that the single-truck car of the same dimensions would be worth now about \$2,000, with electrical equipment and trucks. There would be in the car purchased now better equipment, trucks and motors.

A car axle under the old type of cars would become crystallized and liable to break in about two years. Improvements had been made, which had increased the strength of the steel and iron and reduced crystallization.

CONVENTION COMMITTEE TO TAKE WESTERN TRIP

It will be remembered that at the midwinter meeting of the executive committee of the American Street & Interurban Railway Association, held at the association headquarters in New York City on Jan. 29 last, the committee decided that the 1909 conventions of the association will be held west of the Mississippi River. The cities considered as possibilities by the committee in taking this action are Denver, Kansas City, Omaha, St. Louis and Minneapolis. The committee which will finally decide upon the time and place of holding the conventions consists of the following-named gentlemen: James F. Shaw, Boston (chairman), Chas. N. Black, San Francisco, and E. C. Foster, New Orleans. Past-President John I. Beggs, Milwaukee, will also be a member of the party, and Past-President C. G. Goodrich, Minneapolis, has stated that he would accompany the committee on the trip if possible. A committee from the American Street & Interurban Railway Manufacturers' Association, consisting of Jos. R. Elliott, New York (chairman), James H. McGraw, New York, and C. C. Peirce, Boston, by special invitation will also accompany the committee of the American Association for the purpose of looking after the business arrangements of the Manufacturers' Association in connection with the coming convention.

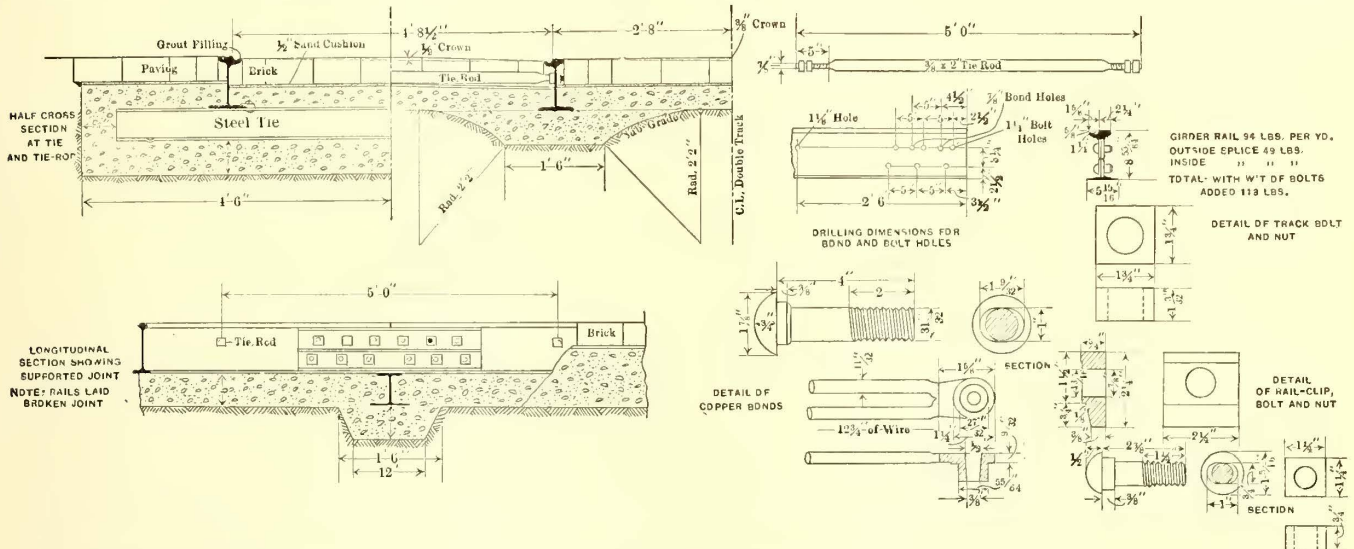
The Eastern members of these two committees expect to leave New York on Saturday, April 17, arriving in Chicago on April 18, and will meet the other members of the committee either in Chicago or Denver. The committees will spend April 20 and 21 in Denver, and will proceed from there to Kansas City, visiting such of the other cities above mentioned as have indicated a desire to be considered in this connection.

IMPROVEMENTS ON THE HAMILTON RADIAL ELECTRIC RAILWAY

The Hamilton Radial Electric Railway is one of several interurban lines entering Hamilton, Ont., owned by the Dominion Power & Transmission Company, Ltd. It is one of the oldest interurbans in Canada, the section to Burlington Beach having been constructed in 1896 and the one to Oakville in 1904. Eventually this railway will be continued eastward through Port Credit to Toronto, thereby affording the means for a high-speed electric service between the latter city and Hamilton, a distance of 40 miles. Considering the class of service which this through line

considerable, but it will cut down the running time and the maintenance of track. A private right of way has also been bought through the village of Burlington. These changes will remove most of the curves on the line and give many long tangents in level country. One tangent is 10 miles long.

The city section of the Hamilton Radial runs through a manufacturing district and therefore has a 10-minute local service with ordinary urban cars. About 1 mile of this part of the line is on a brick-paved street (King Street East) in which the company laid down in the summer of 1907 the steel-tie track construction shown in the accompanying cross-section and details. The ties are Carnegie



Hamilton Radial Electric Railway—Details of Steel Tie—Concrete Construction on King Street East, Hamilton

will give, it was determined to make every effort to cut down the mileage on the streets and highways to a minimum and to widen the roadbed and bridges of the present single-track section extending from Burlington to Oakville,

I-beam type, 8 ft. long, weighing 160 lb. each and laid 10 ft. centers. Tie rods, 3/8 in. x 2 in., are put in every 5 ft. The rails are of the Lorain 313-94 section, 9 in. high, and are placed on concrete stringers. The concrete ballast ex-



Hamilton Radial Electric Railway—Double-Track Section with Alternating High-Tension Poles on one Side



Hamilton Radial Electric Railway—Single-Track Section, Span Type and Double Trolley

11 miles, to accommodate two tracks. The total length of the line from Hamilton to Oakville is now 22 1/2 miles, of which half is single track.

In Hamilton the company is placing about two-thirds of its track on recently purchased private right of way. The initial expense of securing this improved land has been

tends 6 in. under the ties at joints and is carried 4 in. up from the base of the rail. The pavement is plain brick on a 1/2-in. sand cushion. The approximate cost of this track construction was \$4.50 per lineal foot. The exact cost cannot be given, as this work was carried on with the street widening, setting back of curbs, new drains, etc.

The old section from Hamilton to Burlington was laid originally with 64.5-lb. T-rail. This has now been replaced by 80-lb. rail which was used in building the Oakville extension and will be the standard section hereafter. Most of this section has been re-ballasted with 10 in. of slag from nearby smelters, but beach sand is used on the narrow isthmus separating Burlington Bay from the rest of Lake Ontario. Burlington Beach is a very popular bathing resort and can be reached only by the cars of the Hamilton Radial line. This run via the Burlington isthmus also gives the shortest possible route to Toronto, as it avoids a detour around Burlington Bay. The Burlington-Oakville section contains the only bridges on the line. Both are of steel, one 560 ft. long and the other 410 ft. long. They are built for future double-track service.

The overhead construction throughout is of the span-wire type with double trolley on the single-track sections, a practice which appears to be favored by many Canadian interurbans because of its superior flexibility to brackets with single trolley. As on other lines operated by this company, the standard pole spacing is 90 ft., the alternate poles on one side being higher to carry the high-tension transmission wires. Acknowledgments are due C. K. Green, superintendent of construction, for data on the Dominion Company's railways.

NOVEL STOCK LEDGER AND TIME SHEET

There are many small roads whose size does not warrant the exclusive attention of one set of officials. On such roads the bookkeeping is often conducted in the same office as the other lines of business and it is desirable to keep a record of the time spent in each class of work by the

esting. As shown, the headings are arranged to cover a wide range of material and the ledger shows the complete history of all purchases until they leave the stock room. Both sides of each sheet bear the same headings, and the records are carried on to the opposite side of the sheet when one side is full.

The second diagram shows a time chart which is used to record the time spent by employees upon different classes of work. As will be seen it is arranged somewhat like a station log. For the convenience of the employees a list of the primary accounts, classified under each of the four main divisions, is printed on the back of the sheet, so that if the employee is in doubt as to the proper distribution of the work on which he was engaged, he can be set right by referring to the back of his time sheet. This plan is especially convenient for new men since it helps them to make a proper record of their time. On the front of the sheet, opposite the description of the work, is space in which he marks in numbers the class of the work shown graphically by the lines.

INTERURBAN CARS FOR THE BUFFALO & LAKE ERIE TRACTION COMPANY

The Cincinnati Car Company has just delivered to the Western New York Construction Company for its Buffalo & Lake Erie line eight very handsome interurban cars, four of which are of the combination passenger, smoking and baggage type and four combination passenger and smoking cars. These cars will be operated on limited service between Buffalo, Dunkirk and Erie, and are geared for a speed ranging from 55 to 65 m.p.h. The general dimensions of the cars with baggage compartments are: Length over all, 51 ft. 2 in.; width over all, 8 ft. 7 in.; height from

Special Mark	Form	Style No.	Name of Article
Agent	Finish	Capacity	Size
Manufactured by	A. C. or D. C.	Speed	Weight
	Wattage	Voltage	Sold by
			STOCK ROOM
			SECTION
			SIN. NO.
BILL CHECKED	LEDGER	CHARGE SLIP NO.	ORDER NUMBER
			DATE
		AMOUNT ORDERED	AMOUNT RECEIVED
		TAKEN OUT	IN STOCK
		PURCHASED FROM	ISSUED TO
		PRICE	DISCOUNT
		CARTAGE	CROSS PRICE
		CATALOGUE NO.	REMARKS

Stock Ledger Used for Various Purposes, Including Railway Supplies

THE OHIO & SOUTHERN TRACTION CO.

NAME *James Kulwell*

TIME RECORD,

MONTH	DAY	JOB NUMBER	DESCRIPTION OF WORK	CAR NUMBER	OPPOSITE THE DESCRIPTION DRAW A LINE THROUGH THE COLUMNS FROM THE TIME OF BEGINNING TO TIME OF ENDING THE WORK	TOTAL
Feb	22		Maintenance of way and structures		6:30 7 8 9 10 11 12 1 2 3 4 5 6 6:30	3 45
			Maintenance of equipment			3 11
			Operating expense			2 15
			General expense			
			Other work. Remarks <i>Hartman Farm</i>			1
						10 30/0

Blank for Recording Time Spent by Employees on Different Classes of Work

different officials. A situation of this kind exists on the Ohio & Southern Traction Company, which connects the Hartman stock farm with the city of Columbus and is owned by the Hartman interests, which also control the Peruna Company. The railway stock ledgers are kept at the office of the Peruna Company, in Columbus, and the same stock-ledger system is used by the railway company, the stock farm and the Peruna Company. The novel character of the service makes the reproduced heading inter-

bottom of sill to top of roof, 9 ft. 2 in.; seating capacity of main passenger compartment, 30; smoking compartment, 12, and baggage compartment, 12.

The general dimensions of the combination passenger and smoking cars are: Length over all, 51 ft. 10 in.; length over body proper, 40 ft.; width over all, 9 ft. 2 in.; height from bottom of sill to top of roof, 9 ft. 2 in. The main compartment has 38 seats and the smokers' room 16 seats.

In both types the underframing is the same. The side

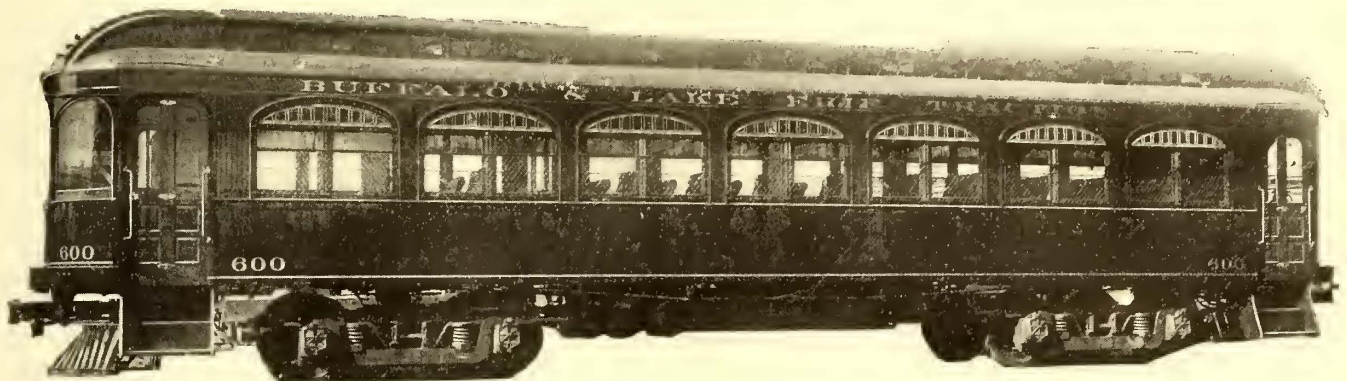
sills are formed of two pieces of yellow pine with a $\frac{3}{8}$ -in. x 24-in. steel plate between, running the full length of car body from end sill to end sill. A $2\frac{1}{2}$ -in. x $2\frac{1}{2}$ -in. angle is riveted near the top of the same to stiffen the steel plate, besides forming a support for the cross seats, a foot rest and a heater pipe cover. The intermediate sills are of yellow pine strengthened with 5-in. x $\frac{5}{8}$ -in. steel plates on each side. The center sills are formed of 5-in. I-beams with yellow pine fillers. Both the intermediate and center sills run the full length of the car from buffer to buffer. The end sills are made of white oak, supported by a 6-in x 4-in. x $\frac{1}{2}$ -in. steel angle bolted to the underside the full width of car. The body bolsters are built up with 10-in. steel plates, of the truss pattern, with bearings on all the longitudinal sills. Besides the steel plate the car body has an over truss and an under truss.

The platforms are flush with the car floor, being supported by the intermediate and center sills, which are reinforced with steel angles running along those sills to a point back of the bolster. Step openings are provided on both sides of each platform. The steps are of the steam coach pattern, having double treads, which, together with

and is fully equipped. The ceilings in both the main passenger and smoking compartments are of the full Empire type, painted dark green and decorated in gold.

Illumination is furnished by seven 12-in. hemisphere Holophane globes in the upper ceiling and some single lamps on the face of the deck sill. The wiring is all run in loricated conduits, no part of which extends below the sills. The seats are of the Hale & Kilburn reversible type, 37 in. long and having high headroll backs, spring-edge cushions and mahogany arm rests on the aisle side. The seats in the main passenger compartment are upholstered in figured green mohair plush, and those in the smoking compartment with dark green leather.

The cars are mounted on Baldwin trucks, class 78-25, with 6 ft. 6 in. wheel base, 36-in. forged wheels, Symington journal boxes and ball center bearings of American Street & Interurban Railway Association standard, and inside hung brakes. The motor equipment consists of four GE No. 204-A commutating pole motors, with double-end type "M" control. The cars are also equipped with Westinghouse AMM schedule air brakes, D-2 compressor and American automatic slack adjuster.



Interurban Car for the Buffalo & Lake Erie Traction Company

the vestibule floors, are covered with knob rubber matting. The edges of the step hangers are bound with brass. The trap doors over these are fitted with O. M. Edwards Company's balanced trap-door fixtures.

The body framing of the cars is very substantial, all the vertical members being of white ash. The sides of the cars below the sash rest are sheathed with $\frac{5}{8}$ -in. x 2-in. face, vertical poplar sheathing backed with $\frac{7}{8}$ -in. poplar blocking. This blocking is gained over and glued and screwed to all the side posts. The roof is of the monitor deck type, with a steam coach style of hood at each end. The roof is strengthened by steel carlines, two of which are placed at each pier post.

The side windows are of the double Pullman design. The lower sash are arranged to raise into the roof, and have Edwards sash locks and racks. The upper sash of the side windows are semi-elliptic and glazed with leaded art glass. The deck windows are also semi-elliptic and glazed with green opalescent glass. The deck windows are hung on Hart's deck sash ratchets. The center vestibule window is stationary and the two wing drop-windows also have Edwards sash racks and locks.

Both the main passenger and smoking compartments are finished throughout with Honduras mahogany, all the main panels having a neat border of marqueterie inlay. The baggage compartment is handsomely finished in dark golden oak. There is a salon in each car, located in the rear left-hand corner of the main passenger compartment. It is finished to correspond with the interior finish of the car,

The miscellaneous equipment of the cars consists of the following:

- Curtain Supply Company's curtains, No. 88 ring fixtures.
- Peacock hand brake mechanism.
- Tomlinson couplers, each end.
- Nickeline water cooler.
- Side window screens of the removable type.
- Nichols-Lintern air-operated sand boxes.
- Locomotive wooden type pilots, each end.
- Germer hot water heater.
- General Electric magnetite arc headlight.
- Illuminated dash signs.
- Tornado tail lamps.
- Dayton Manufacturing Company's individual bronze rod parcel racks.
- Knutson "Peerless" trolley retriever.
- Emergency tools.

This rolling stock left the builders' shops complete, ready for operation, with the exception of the motors, which are being installed at the railway company's shops at Blasdell, N. Y.

GAME OF RAPID TRANSIT IN LONDON

An ingenious manufacturer of games in London has brought out a colored map of the city, with the subway routes and stations marked on it, designed to be used as a game. Each player is provided with a miniature pasteboard car and, after drawing a ticket, attempts to move the car between the two points mentioned on the ticket, according to directions on a dial which is spun around on its axis. The winner is the one who reaches his destination first.

News of Electric Railways

Cleveland Traction Situation

The evidence taken before Master Commissioner Belford on March 16 concerned the fund that was turned over to the Municipal Traction Company to pay debts of the Cleveland Railway as they came up. Items have been charged against this fund which the Cleveland Railway claims should have been charged to expenses of the Municipal Traction Company or some other fund, as the Cleveland Railway had nothing to do with the payment of the debts so incurred. The lease provided that all payments from this fund should be approved by the Cleveland Electric Railway, but the Cleveland Railway says that payments were made without such approval.

Herman Schmidt applied to the Council on March 15 to be allowed to bid on 13 lines on which the franchises expired in January, 1910, and later. This, it seems, is in line with the ideas of Mayor Johnson. Mr. Schmidt is said to represent the Forest City Railway, which has no property and no capital stock outstanding except about 300 shares which were not turned over to the Cleveland Railway.

At the meeting on March 16, the Mayor announced that the conferences in private which he, City Solicitor Baker, Judge Tayler, Attorney John G. White, Mediator F. H. Goff and Attorney D. C. Westenhaver attended, had proved failures and that public meetings of the Council committee of the whole should be held in the future. The Mayor said the question of adapting the Tayler plan of settlement would be taken up first, and he expressed some hope of it being accepted, but that in the meantime the necessary formalities requiring 60 days to institute bidding for new franchises on the Superior, Payne and St. Clair lines should be started. In case the Tayler plan is rejected, one of the other plans will be taken up. For that purpose he had a resolution adopted directing the city solicitor to prepare four sets of ordinances for introduction at an early date. These the Mayor outlined as follows:

1—The Tayler plan for a general settlement, so far as this plan can now be reduced to writing.

2—Grants to the Cleveland Railway on a 3-cent fare basis and revocable, the grants when passed to be tendered to the Cleveland Railway.

3—The same grants to the Forest City Railway.

4—Competitive bidding for the franchises among such companies as may wish to enter.

In addressing the Council on March 15, Judge Tayler said:

"We have those two correlated rights—the proprietary interest of the city in the streets, the necessity that methods of transportation be placed on the streets, and the right of the people who furnish that to have a fair return, and no more.

"We have been going here for a great many years on a certain theory of giving franchises, all based upon a wrong view of the rights of both sides, so far as the people were concerned, the giving of a monopoly without suitable restraint, and on the other side such a condition of things that the necessities of their situation, the expiration of their grants at some time in the future, compelled them as business men to make the very best bargain they could, with the result that scandal and injustice have from the beginning characterized a large number of street railway enterprises in all of the great cities of the country.

"Now, it seems to me that the time has come when that fundamentally unjust basis of the settlement of a great public question like this no longer exists, and that we should reach a settlement of it on the foundation that the public owns the streets, and that the people who furnish transportation are entitled to a fair return, a sure return, and nothing more.

"However the gentlemen with the duty of framing an ordinance whose fundamental features I have described may go about it, the people are unconcerned. There ought to be no grave difficulties in the way. An accommodating spirit, a spirit accommodating itself to that settlement, anxious to bring about that settlement, on both sides of this controversy, will necessarily result in a settlement of this controversy, because the differences can only arise from details which in and of themselves are not vital to the working out of the plan whereby this settlement can be reached.

"While it is not for me to criticise any plan which Mr. Johnson may have, I would regret, gentlemen, very much indeed, if any element of any character was injected into

these negotiations that would leave an impression that a threat of ultimate war was in the air.

"I think that in Cleveland we have left behind us the day when any fixed rate of fare shall be said to be the rate of fare which the people must pay or which the corporation which furnishes the transportation can charge; for any rate of fare may be too high or any rate of fare may be too low.

"What we are entitled to is good service at the cost of the service, whether it is 1 cent, 2 cents, 3 cents or 4 cents. That is the only sound basis upon which a street railway settlement can rest.

"I appeal to you (the Council) on behalf of the entire community, which wants repose and settlement and adjustment after all these long years of warfare, that they may have better service everywhere, that the property may be put into first-class condition, that the service may be all that is required."

The Cleveland Chamber of Commerce has appointed a committee to draft and present an ordinance in case the committee of which Judge Tayler, Mayor Johnson and others are members fails to agree upon terms, as has been indicated by their not meeting for some time. Business men are in accord with Judge Tayler's plan of settlement, realizing that the Mayor is not benefiting the city or any of its people by insisting upon the unreasonable—and to the Cleveland Railway the impossible—condition that would be imposed by inserting an option clause to the effect that the property may be taken over by the city at 110 any time after the lapse of two or three years. If a 25-year franchise is given the company with the provision that the rate of fare shall be governed by the net surplus and fixed by a committee of business men, it would seem that all cause for objection would be removed. Unless a franchise is given that will properly secure the money necessary to rehabilitate the property thoroughly the company will be unable to finance the improvements.

The Cleveland Railway has asked that the \$220,000 rental due it on Oct. 1, 1908, and the \$150,000 of its notes used by the Municipal Traction Company be made preferred claims. Judge Tayler will hear arguments on this point this week. The receivers have set aside about \$179,000 as a maintenance fund at the rate of 5 cents per car mile. As there is about \$600,000 cash to the credit of the company, after making these deductions, about \$300,000 would be at the disposal of the court. Since the receivers have taken charge of the property their reports have contained charges for rental to the old company and the Municipal Traction Company. The court has intimated that rental must be paid or the property turned over to the owner; so it remains to be seen just what can be done for the creditors, who are insisting that their claims be paid, or partially paid, at least.

The retail merchants' board of the Chamber of Commerce on March 19 adopted a resolution to the effect that the long-continued strife has held back the commercial development of the city to a degree that can hardly be overstated, and that no suggestions which would tend to continue the struggle ought to be entertained. A copy of this resolution was sent to each newspaper, with such changes in one clause as would make the resolution applicable to the paper receiving it.

In the résumé of the Cleveland situation in the *ELECTRIC RAILWAY JOURNAL* of March 13, it should have been specifically stated that the operating statement of the Cleveland Railway which was published in that issue was for February.

Chicago Subway Report

A subway bureau, working under the direction of the local transportation committee of the Chicago City Council, has just published a three-volume report setting forth the desirability and the feasibility of an immediate beginning of subway construction to take care of part of the present street and elevated car traffic and runways for other utilities. Detail plans for building, with estimates for costs, are given, and the suggestion is made that the aim of the city should be to reduce surface congestion in the central district, rather than afford rapid transit to distant parts. The present report makes definite recommendations for the routes to connect the North, South and West Sides with the loop district. Information and a large number of maps provide a complete exposition of the underground structures now below the streets of the proposed subway district from Chicago Avenue to Twelfth Street and from Lake Michigan

to Halsted Street. An analysis of the water supply also has been given to determine the adequacy of the present piping and to plan for the future. The report also presents a study of the underlying soil and building foundations necessary for determining the proper methods of subway construction.

The plans for this subway system as outlined in the report contemplate excavating from curb to curb with the tracks placed about 18 ft. below the pavement and a mezzanine floor on which the transfer passageways and ticket stations will be located 7 ft. below the pavement. Underneath the four tracks a clear space for the width of the street and 7 ft. 8 in. high is contemplated for the accommodation of pipes, wires, conduits, cables, etc., of the various public utility companies. The level of this utility space is directly above the existing tubes of the Illinois Tunnel Company.

The authors of the report suggest that it will be desirable first to construct four-track subways, or their equivalent, north and south along the east margin of the city, extending from the vicinity of Chicago Avenue and Orleans Street on the North Side to the vicinity of State and Twenty-second Streets on the South Side; and following this, or contemporaneously with it, to construct other subways in the form of a horseshoe closely paralleling the north and south subway through the business district and with the western termini at Halsted Street and Blue Island Avenue and at Halsted and Lake Streets. It is proposed to provide outlets at all four of the immediately built subway terminals so that surface or elevated cars may pass to and from the underground tracks. It is suggested that two tracks in the north and south subway might be used for surface lines and two tracks for elevated trains; also that the trains of the Northwestern Elevated Railroad might enter the subway in the vicinity of Chicago Avenue and run through to an outlet in the vicinity of State and Twenty-second Streets, there to turn and re-pass through the subway and out to the North Side. The trains of the South Side Elevated lines might use the same tracks as proposed for the Northwestern Elevated, entering at Twenty-second Street, passing through and turning at Chicago Avenue, then traversing the same route southward to emerge at Twenty-second Street. Likewise, the surface cars might be diverted to the subway entrances and use two of the tracks to and from the crowded loop district. It is not intended to divert all the trains or cars of the elevated and surface lines, but only a sufficient number to relieve congestion on the streets within the Union Loop district. The subways suggested would not constitute an entire system, but merely would be parts of the comprehensive system to be built in accord with the growing demands of the city.

The present report comments on the details of trial subway structures and makes suggestions for the arrangement of tracks, platforms, etc. Island platforms 16 ft. wide are recommended to be longer than necessary for accommodating one train of nine cars on each side. A wide mezzanine gallery or vestibule above the tops of the cars and with stairways at each end leading to the street surface is proposed as a means for passengers to reach any of the platforms or to cross a congested street. These vestibules would be located approximately in the middle of a block. Reinforced concrete is recommended as the material for the walls, with possibly steel columns, beams and arches.

With regard to the method of proceeding with the work the report recommends that the side walls at curb lines should be built first, followed by a transverse trench for temporary bracing across the street, when the construction of interior footings, transverse girders and the erection of columns may be completed and the walls permanently secured prior to excavating the main portion of the subway prism.

Figures on the cost of constructing the subways are as follows:

	* Cost per mile.
Four-track subways, as in Wabash Avenue.....	\$3,750,000
Three-track subways, as in Washington Street....	3,375,000
Two-track subways, as in Van Buren Street.....	3,000,000
One-track tunnels, as under the rivers.....	800,000

Another Subway Proposal in New York

On March 18 the Bradley, Gaffney, Steers Company, New York, filed an application with the Public Service Commission of the First District of New York to build the proposed Lexington Avenue subway in New York with private capital. This is the fourth plan for building subway lines in New York to be proposed within two weeks. The letter of Henry Steers, president of the Bradley, Gaffney, Steers Company, to the Public Service Commission in which the offer to build the line is made follows:

"We have a considerable degree of familiarity with the rapid transit situation in New York and a wide experience in the construction of tunnels. We have made a careful study of the increasing traffic needs of the city with the aid of the best engineering and financial advice obtainable. We are prepared to make and accordingly submit to you the following proposition for the construction and operation of a subway system of rapid transit.

"We will contract, for the city of New York, the Lexington Avenue subway from a point in the Bronx to a junction with the bridge loop, the exact location to be determined by you, and will equip, maintain and operate the same upon the following basis:

"1. The said railway and equipment shall belong to the city of New York, but the possession of and the right to operate the same shall remain with us until the cost, which shall be deemed to be the actual expenses incurred plus 15 per cent, as an engineering profit to us, shall have been fully paid with 5 per cent interest per annum.

"2. The operation of said railway shall be lodged in a board of seven members, four of whom shall be named by us and the remaining three to be the Mayor of the city, the Comptroller of the city and the chairman of your commission, subject to the rules and regulations of your body.

"3. The proceeds of such operation, after paying the expenses of operation and maintenance and interest upon costs, shall be devoted one-half to the payment of cost and the remaining half paid to us.

"4. We will make such connections with such other existing lines of railways and exchange transfers therewith at such points and upon such terms as may be agreed upon, subject to your approval and direction.

"5. Should the cost not have been paid prior thereto, at any time after 25 years the city may have the option of taking over the operation of said railway upon paying to us the unpaid portion of said costs.

"We have the necessary equipment and organization and upon the execution of the contract substantially embodying the foregoing and the completion of necessary legal steps and engineering plans we are prepared to proceed with the said work upon 30 days' notice without calling for aid or credit of the city."

The Lexington Avenue subway route, as adopted by the Public Service Commission in December, 1907, runs from the Battery through Greenwich and Vesey Streets and Broadway to Ninth Street, thence under private property and streets to Irving Place, thence up Irving Place and Lexington Avenue to the Harlem River, thence to 138th Street, where it divides into two branches, one going north through Mott, River and Jerome Avenues; the other northeast through 138th Street, Southern Boulevard and Westchester Avenue to Pelham Bay Park.

Famous Private Car Burned.—The Josephine, the private car of H. A. Everett, president of the Northern Ohio Traction & Light Company, Akron, Ohio, was destroyed in a fire at the paint shop of the company at Silver Lake Junction recently. The car was undergoing repair at the time of the fire.

April Meeting of Central Electric Traffic Association.—The next meeting of the Central Electric Traffic Association will be at the Lima House, Lima, Ohio, Friday and Saturday, April 16 and 17, 1909, to continue the checking of rates in the tariff that is under consideration as well as to consider other matters which may be properly brought before it. There will be an evening session on Friday evening.

Hudson & Manhattan Railroad Leases Uptown Terminal Site.—The Hudson & Manhattan Railroad, New York, has leased its uptown terminal site on the west side of Broadway, between Thirty-second and Thirty-third Streets, to Gimbel Brothers, Philadelphia and Milwaukee, who will erect a department store on the property. The station of the Hudson & Manhattan Railroad will be in the new building.

Meeting of the Massachusetts Street Railway Association.—A meeting of the Massachusetts Street Railway Association was held at Young's Hotel, Boston, on March 16. The address of the evening was presented by Calvert Townley, vice-president of the Connecticut Company, on "The Combined Operation of Steam and Electric Railways." Mr. Townley briefly described the combined service operation of the Connecticut Company, in which an electrified section of steam track is connected at each terminal with existing city trolley tracks and a through service instituted on the order of the regular trolley interurban service, with this difference, however, that the steam tracks still continued to be used by steam trains. The three places where this service has been instituted are from Norwich to Central

Village, from Middletown to Meriden and to Berlin, and from East Hartford to Rockville and Melrose, all in Connecticut.

Hearing on Boston & Eastern Electric Railroad's Tunnel Project.—The committee on metropolitan affairs of the Massachusetts Legislature gave a hearing on March 15 on the bill providing for the construction by the Boston & Eastern Electric Railroad of a tunnel under Boston Harbor and a subway in Boston connecting with a terminal in or near the Post Office Square district. W. E. Chappelle, former president of the Senate, appeared as counsel for the company and outlined its plans as previously printed in these columns. He stated that the question of necessity has already been determined by the Railroad Commission, the formal approval being withheld pending the legislative sanction of the tunnel construction. The total cost of the road would be about \$11,000,000, the tunnel cost being estimated at \$2,800,000. The company has now expended about \$75,000 in engineering studies, and is prepared to build as soon as authorized. The tunnel bill is practically the same as the Cambridge subway bill. The company stated that if the Legislature desired it would consent to have its bill modified so that Boston could build the subway and tunnel, but that it cannot afford to wait until the city is ready to take up the burden. The hearing was largely devoted to cumulative testimony in favor of the project, the opposition being expected at later hearings.

Minneapolis Company Explains Its Position in Fare Suit.—The letter of C. G. Goodrich, president of the Twin City Rapid Transit Company, Minneapolis, Minn., to the Aldermen of Minneapolis withdrawing the request that the city discontinue its suit against the company for six-for-a-quarter fares explains the position of the company in regard to the suit. The letter follows: "The Minneapolis Street Railway desires to withdraw its request under date of Feb. 26, 1909, that your honorable body appoint a committee to meet the representatives of this company for the purpose of considering the question of dismissing the so-called 'six-for-a-quarter' suit now pending in the United States Supreme Court. This withdrawal is prompted by a desire on the part of the company not to ask your honorable body to take any action which may meet with disapproval from any source. We prefer to let the judgment of the Supreme Court finally decide the question at issue. On behalf of the company, I desire to thank your honorable body for the appointment of the special committee to which our communication of Feb. 26 was referred, and regret that, through a misunderstanding on our part as to the date when your committee was to meet, no representative of the company was present at the meeting held on March 9. We also desire to thank our many friends for their encouragement and the interest shown by the voluntary circulation and signing of a petition to the City Council requesting a settlement of the case." References to the suit were contained in the *ELECTRIC RAILWAY JOURNAL* of March 13, 1909, and March 20, 1909, pages 480 and 523, respectively.

Hearing on Proposed Transit Extensions and Changes at Boston.—The committee of the Massachusetts Legislature on metropolitan affairs gave a hearing on March 16 on the bills providing for the restoration of elevated train service in the Tremont Street subway, the replacement of the elevated structure in Washington Street by a subway, new subway construction to the South Station, and the change of the location of the Cambridge subway's Boston terminal from Park Street to Scollay Square. Corporation Counsel Babson of Boston protested against the city assuming any more burdens at present on account of transportation improvements. Regarding the proposed subway and removal of the elevated structure from Castle Street to Dudley Street, Mr. Babson said that this would cost from \$6,000,000 to \$10,000,000, and the city could not afford the expense the improvement would entail. Neither the city nor the Boston Elevated Railway wants to restore train service in the Tremont Street subway. The cost would be at least \$300,000. President Bancroft of the Boston Elevated Railway described the improvements of the past few years, and stated that the use of the Tremont Street subway by elevated trains was from the first understood to be merely a temporary arrangement. The Washington Street tunnel and the Atlantic Avenue elevated line could be used to only about two-thirds of their capacity as designed if the train service should be again undertaken in the Tremont Street subway, which was never intended for train service anyway, and which required great skill and expense for successful train operation. The Cambridge subway is to be terminated at Park Street because the Boston Transit Commission so decided the matter, and this was favored by the company as the destination of its patrons. General Bancroft also emphasized the increase in fixed charges which all the subways impose upon the company in the face of a decreasing rate of revenue gain. It is estimated that by 1915,

when the improvements now under way are taken over by the company, the income will be inadequate to pay any dividends if the present conditions hold. The company and the city have invested \$67,000,000 and are committed to an additional investment of about \$44,000,000.

LEGISLATION AFFECTING ELECTRIC RAILWAYS

Missouri.—The bill creating a public utilities commission, mention of which was made in the *ELECTRIC RAILWAY JOURNAL* of March 13, has been introduced in both the Senate and the House and referred to committees. Up to March 20, neither of the committees had reported it back, but it is generally expected that the measure will be reported favorably. On March 19 Senator Gardner, of St. Louis County, introduced by request a bill providing for a 3-cent fare on street railways in all cities of the State from 5 a. m. to 7 a. m. and 6 p. m. to 8 p. m. The bill stipulates that tickets must be issued in coupon form and that 10 tickets be sold for 30 cents, 20 for 60 cents, 50 for \$1.50. A transfer must be issued upon each ticket when demanded. Violation of the law entails a fine of not more than \$1,000 nor less than \$250. Each refusal to sell tickets as prescribed by the ordinance will be considered a separate offense. On March 19 Mr. Carter introduced a bill in the House at the request of Attorney-General Major to place the regulation of railroad passenger rates under the supervision of the State Railroad and Warehouse Department. The act, which was drawn by Mr. Carter and approved by the attorney-general, authorizes and empowers the Warehouse Department or any public service commission which hereafter may be created by law, to prescribe and affix the maximum rate of fares for passenger travel over railroads within the State.

New Jersey.—Governor Fort sent a special message to the Legislature on March 16 in which he said that if the Legislature adjourned sine die without enacting his reform election laws he would reconvene the House and Senate in special session. The Pierce public utility bill is still in committee, and the Martin public utility measure has not been advanced. Thus there is no change in this respect over a week ago. An effort was made in the Senate to amend the Gaunt electric railway freight bill so as to make it operative only in cities of less than 40,000 population and to provide for the construction of terminals and limit rights under the act to five years. Both amendments were lost, and the bill was passed as originally presented and published in the *ELECTRIC RAILWAY JOURNAL* of March 16. A special measure has been introduced to authorize the Atlantic City & Shore Railroad to control and operate the Central Passenger Railway, Atlantic City. Chancellor Pitney, as noted on page 484 of the *ELECTRIC RAILWAY JOURNAL* of March 13, recently held that the Atlantic City & Shore Railroad was not authorized by law to acquire the Central Passenger Railway.

New York.—There was a hearing before the judiciary committee of both houses on March 17 on the Travis-Lee constitutional amendment exempting income-producing bonds for transit, water supply and dock purposes from New York City's debt limit. Chairman Willcox and Commissioner Bassett, of the Public Service Commission of the First District, delegations representing civic bodies of both New York and Brooklyn and individuals all appeared to favor the measure. Senator Wagner, who recently made a special study of the city debt problem for one of his clients, issued a formal statement urging the adoption of the amendment. It will be recalled that the majority of the Cassidy commission, which conducted a special investigation of the finances of New York City, reported in opposition to the constitutional amendment exempting income-producing bonds from the debt limit. Mr. Willcox said that the conclusion of the Cassidy commission that additional subway construction should be accomplished by private capital solely was erroneous. He concluded by saying that the amendment was needed for the best interests of the city even though resort to its provisions never became necessary. No one was present in opposition to the measure. Another amendment to the public-service law has been introduced. It gives the commissions authority over water companies. On March 18 Senator Wainwright introduced a bill authorizing the New York, Westchester & Boston Railroad and the New York & Port Chester Railroad to consolidate with the approval of the holders of two-thirds of the outstanding stock of each company and the Public Service Commission of the Second District. The Supreme Court is authorized to fix the value of the holdings of stockholders not assenting. On March 19 Chairman Willcox and Commissioners Bassett, McCarroll and Maltbie, of the First District, conferred with Governor Hughes at the Hotel Astor, New York, but refused to discuss the meeting for publication other than to say that it concerned the rapid-transit situation in New York.

Ohio.—The session of the Legislature which convened on Jan. 5 and adjourned on March 12 was a special session called by the Governor principally for the purpose of electing a United States Senator. The feature that attracted most attention, perhaps, was the reappointment of J. C. Morris as a member of the Railroad Commission by former Governor Harris and the appointment of John C. Sullivan by Governor Harmon as a successor to Mr. Morris. Both appointments have been confirmed and the matter now goes to the courts for settlement. Only one bill affecting the electric railways passed both houses and has been signed by the Governor. It provides for the free transportation of peace and safety officers while on duty by electric railways. The measure follows: "Section 1. That hereafter upon the granting of franchises to traction companies throughout the State of Ohio, for the use of streets, roads and highways for the transportation of passengers, it must be provided, as one of the considerations for such use of the public highways, that said traction companies carry free as passengers on any and all regular cars peace and safety officers, such as police and firemen, when on duty and in uniform." The most pretentious measure of the session, the Woods bill, which provided for a commission of two members to appraise the property of public-utility corporations, after being amended and passed by the House, was permitted to die in committee in the Senate. One member of the commission was to be a Republican and the other a Democrat, with an arbiter to be appointed by the Supreme Court if necessary. The board would have succeeded 12 boards of elective officials.

Pennsylvania.—On March 15 two important measures affecting electric railway interests were introduced in the House by Representative Keister of Harrisburg, giving to street railway companies the power to enter upon and take for trackage any portion of the highway upon which their lines are laid, without the consent of any abutting property owners. Mr. Keister stated that he introduced the bill at the request of Secretary Stine of the Pennsylvania Street Railway Association. The title of the bill is "To enable street railway companies operating in whole upon a public highway or highways to straighten, relocate and otherwise improve their lines or railway, and lay additional sidings." It is provided that the owner of the land shall be compensated and that when an agreement as to the compensation cannot be reached the value is to be determined as is provided in the act of 1880, authorizing companies to locate or relocate their lines on public highways and granting them the right of eminent domain. The Reynolds bill granting companies like the McCall's Ferry Power Company the right of eminent domain will be vigorously opposed by certain interests, but it is thought that the measure will pass. A similar bill was defeated in the Legislature two years ago. The bill provides for the merger and consolidation of electric light and power companies, and another bill from the same author contemplates the incorporation of the consolidated companies. The Railroad Committee of the House gave a hearing on March 23 to representatives of steam and electric railway companies who are opposing the bill extending the powers of the State Railroad Commission to embrace the control of stock and debt increases of corporations. Attorney W. H. Allen of the State Railroad Commission has submitted a brief to the Railroad Committee setting forth that "many of the serious complaints made to the commission involving questions of public service are directly traceable to the evil of overcapitalization." The brief stated that the greatest evils were in reorganizations, and it was said that by placing a check on increases the public might be spared many impositions. The Houck bill to increase the membership of the State Railroad Commission from three to seven was amended in the House to make the commission five members instead of seven. It was then sent to the Appropriation Committee. The Sproul anti-spitting bill has passed the Senate and is quite certain to pass the House. Committing magistrates are empowered to fine offenders \$1 and costs or sentence them to five days' imprisonment. This bill has the backing of the State Health Department. The House has also passed the bill allowing brothers and sisters to bring suit for damages for injury causing death. The same body has passed the bill to permit the merger of corporations having the same objects but chartered under different laws. This act will replace the present merger law. No more new bills are now being introduced unless unanimous consent has first been obtained by the author.

Utah.—The public-utilities bill, introduced in accordance with the recommendation of Governor Spry, as noted in the *ELECTRIC RAILWAY JOURNAL* of Feb. 27, has been killed in the Senate. Senator Badger, author of the measure, said that in the event of its defeat, he would endeavor to resuscitate it in the form of an amendment, but he has not made good his threat.

Financial and Corporate

New York Stock and Money Market

MARCH 23, 1909.

The feature of the stock market to-day was the startling break in the shares of the traction companies operating in Manhattan and the Bronx. Without any apparent development that had not been known for several days, prices began to decline soon after the opening, and at the close of the day the Interborough-Metropolitan common recorded a loss of 2¼, the preferred 4¾, and Third Avenue 7¾. A week ago Interborough-Metropolitan preferred was selling at about 45 and Third Avenue in the neighborhood of 40. At the low point to-day they were 36¾ and 27¾. The order of the United States Court for the sale of the property of the Metropolitan Street Railway Company is of course sufficient to disturb the holders of Interborough-Metropolitan securities. The latter road owns 90 per cent of the stock of the Metropolitan company. To protect this enormous interest a large sum must be raised. As the date of the sale is fixed for June 1, there is very little time left to perfect a reorganization, if it has not been planned. The sudden break in Third Avenue may be attributable to a sympathetic alarm. While that road is now separate from the Metropolitan System, it is still in the hands of a receiver, and no one knows when the court may order a process similar to that directed for the Metropolitan.

Throughout this demoralization of tractions, Brooklyn Rapid Transit was unaffected. The strength of the general market is well indicated by the fact that, in spite of this small flurry in traction securities, the general list was not materially disturbed. For the last week trading has been very dull, but prices have been firm, and yesterday there was the sharpest advance in the active issues that has occurred within the last month.

The money market continues to be in a very satisfactory condition, cash being plentiful and rates easy. Bonds are still taken with sufficient eagerness to make the market altogether pleasing to those who have in contemplation large developments. The quotations for money to-day were 1¼ to 2 per cent for call loans and 2½ to 2¾ per cent for 90 days.

Other Markets

Philadelphia Rapid Transit has again become one of the active stocks in the Philadelphia market. Union Traction also has been prominent in the market, daily sales having run into the hundreds, but with no material advance.

In the Chicago market there has been little activity in tractions, Subway being the only stock in which any interest has developed. While trading in this has been fairly active there has been little improvement in price, and 26½ is still the prevailing figure. There has been limited trading in Chicago Railways, Series 2 and 3.

While the trading at Boston has not been particularly heavy, public interest has been more in evidence. Boston Elevated and Massachusetts Electric have been particularly favored. Prices remain practically unchanged.

Trading in Baltimore is still confined to the bonds of the United Railways. The 4s are especially active but prices are little changed, 86¾ being the ruling figure. The incomes are selling at 53¾.

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

	Mar. 16.	Mar. 23.
American Railways Company, Philadelphia.....	45¾	*45¾
Boston Elevated Railway.....	127¾	126¼
Brooklyn Rapid Transit Company.....	71¼	71¼
Chicago City Railway.....	*185	*185
Cleveland Railway.....	—	—
Consolidated Traction Company of New Jersey.....	a78	a77½
Consolidated Traction Company of New Jersey, 5 per cent bonds.....	a107	a106
Detroit United Railway.....	*61	*61
Interborough-Metropolitan Company.....	147½	12
Interborough-Metropolitan Company (preferred).....	44¾	37¾
Manhattan Railway.....	142½	143
Massachusetts Electric Companies (common).....	*143¼	143¼
Massachusetts Electric Companies (preferred).....	*71½	71
Metropolitan West Side Elevated Railway, Chicago (common).....	*19	*19
Metropolitan West Side Elevated Railway, Chicago (preferred).....	*48	*48
Metropolitan Street Railway.....	*28	*28
North American Company.....	78¾	*78¾
Philadelphia Company, Pittsburg (common).....	47	41¾
Philadelphia Company, Pittsburg (preferred).....	42¾	*42¾
Philadelphia Rapid Transit Company.....	27¾	28
Philadelphia Traction Company.....	91½	92½
Public Service Corporation, 5 per cent collateral notes.....	a100½	a100½
Public Service Corporation certificates.....	a81½	a82½
Twin City Rapid Transit Company, Minneapolis (common).....	*105	*105
Union Traction Company, Philadelphia.....	53½	53¾

a Asked. * Last sales.

Decree of Foreclosure and Sale Against the Metropolitan Street Railway, New York

Judge Lacombe of the United States Circuit Court on March 18 filed a decree of foreclosure and sale of the Metropolitan Street Railway, New York, N. Y., in the proceedings instituted against the Metropolitan Street Railway by the Guaranty Trust Company, New York, as trustee of the \$12,500,000 general collateral trust 5 per cent bonds, on which the interest was defaulted in February, 1908. The decree gives the Metropolitan Street Railway 20 days within which to pay \$13,589,270.83 with interest at 6 per cent. in default of which payment William L. Turner, special master, is directed to sell the company's property at public auction to the highest bidder, on June 1.

The foreclosure decree does not include the Central Park, North & East River Railroad, the Twenty-eighth & Twenty-ninth Street Crosstown Railroad and the Fulton Street Railroad. The owners of the Central Park, North & East River Railroad are operating that property, having taken it over when the Metropolitan Street Railway defaulted on the lease. The receivers of the Metropolitan Street Railway have also abandoned the Twenty-eighth & Twenty-ninth Street Crosstown Railroad and the Fulton Street Railroad. The receiver of the Twenty-eighth and Twenty-ninth Street Railroad is operating that road, but the receiver of the Fulton Street Railroad has abandoned operation entirely. Foreclosure suits are pending against both companies.

Alexander J. Hemphill, acting president of the Guaranty Trust Company, New York, and chairman of the committee representing the holders of the 5 per cent. bonds of the Metropolitan Street Railway, says that no definite plan for action has been decided upon nor has a plan been formally adopted for the reorganization of the company. Edwin S. Marston, president of the Farmers' Loan & Trust Company, New York, is chairman of the committee which represents the holders of the \$16,604,000 of refunding mortgage 4 per cent. bonds.

Theodore P. Shonts, president of the Interborough-Metropolitan Company, which acquired \$42,740,000 of the \$52,000,000 capital stock of the Metropolitan Street Railway, intimated recently that the Interborough-Metropolitan Company might be a bidder at the foreclosure sale. It was stated at the time that the preferred stockholders of the Interborough-Metropolitan Company might possibly be assessed to raise the funds with which to buy the Metropolitan Street Railway.

Judge Lacombe's memorandum, which was filed with the decree, after providing for obtaining the fullest information about the property, said:

"The date of sale is fixed as June 1 in order that any one who wishes to review any of the provisions of the decree may have ample opportunity to present the same to the Circuit Court of Appeals. The record is printed and there is nothing to cause delay in the presentation or hearing of such appeal, which will be given preference in that court.

"The property hereby directed to be sold shall be subject to all taxes, assessments or liens prior to the mortgage to the complainant, existing in favor of any person or persons, corporation or corporations not a party to the cause, except such as are herein specifically directed to be paid out of the proceeds of the sale.

"Under the right reserved to the purchaser to refuse to adopt any particular lease or traffic agreement, it is impossible that one or more of the leased lines may be thrown off, but the court is unwilling at this stage of the proceedings to permit a complete disintegration of the system. To do so would put it in the power of the owners of roads which are now money makers for the system to take them out of it. So far as the Court may be able to preserve the road as a going concern, it should do so.

"In the event of the insufficiency of the proceeds of sale to pay in full the amounts herein directed to be paid out of such proceeds prior to the principal and interest secured by the mortgage to the complainant, the Court reserves the right from time to time to require the payment of the deficiency by the purchaser under this decree. In the event of the refusal or omission of any purchaser to pay the amount so required to be paid within 30 days, the Court reserves the right to retake and resell the property sold under this decree to such purchaser, and to apply the net proceeds of such resale to the payment of the deficiency with which such purchaser is chargeable, rendering unto such purchaser the surplus, if any."

American Railways Company, Philadelphia, Pa.—The American Railways Company has addressed the following communication to the holders of the 4 per cent collateral trust gold bonds of the Interstate Railways Company: "Having purchased a large amount of the 4 per cent col-

lateral trust gold bonds of the Interstate Railways Company, we will buy any or all of the remainder of said issue on the same terms and conditions, viz.: At 50 per cent of their par value, giving in exchange therefor our 50-year 4½ per cent gold bond, bearing interest from Jan. 1, 1910, and convertible into stock of this company, at par, at the option of the holder, on and after Jan. 1, 1911, and prior to Jan. 1, 1915. Under the terms and conditions and upon the provisions contained in the agreement securing the same, made and executed to the Equitable Trust Company, Philadelphia, as trustee, and deposited with it, if the American Railways Company does not acquire the collateral securing the Interstate bonds on foreclosure sale, or otherwise, the American Railways Company will, on request of the holder of the said 4½ per cent bonds, on or before Jan. 1, 1915, pay said bonds at par, and the company will also pay each depositor his pro rata share of one-half of any amount over and above 50 per cent of the face value of said Interstate Railways Company bonds, less expenses, which may be realized in cash by the American Railways Company on distribution of proceeds of sale of such collateral or otherwise prior to said sale. Holders of any of said Interstate bonds may deliver their bonds to the Equitable Trust Company on and after this date and receive in exchange temporary bonds of this company. Any holders desiring further information are requested to communicate with the undersigned (American Railways Company), by whom it will be fully given. The right is reserved to withdraw this offer at any time without notice." Referring to this notice, Edward J. Moore, Caleb F. Fox and William Ratch Wistar announce that they have sold their Interstate bonds to the American Railways Company under the conditions set forth.

Buffalo & Lackawanna Traction Company, Buffalo, N. Y.—The Public Service Commission of the Second District of New York has authorized the Buffalo & Lackawanna Traction Company to execute a first mortgage for \$1,500,000 in favor of the New York Trust Company to secure an issue of \$1,000,000 of 5 per cent 20-year gold bonds of the denomination of \$1,000 each to be sold for cash at a price not less than 80 per cent of the par value.

Chicago (Ill.) City Railway.—The City Council has passed the ordinance authorizing the Chicago City Railway to lease the Southern Street Railway. The transportation committee of the City Council appraised the property and franchises of the Southern Street Railway at \$750,000. The Chicago City Railway will operate the Southern Street Railway under the same conditions that it does its own lines.

Cincinnati, Newport & Covington Light & Traction Company, Covington, Ky.—At the recent annual meeting of the stockholders of the Cincinnati, Newport & Covington Light & Traction Company, the following directors were elected: Louis J. Hauck, James C. Ernst, J. M. Hutton, Charles Thurnauer, Julius Fleischman, Clayton Garvey, and Richard Neff. Cincinnati; C. S. Hamilton, Covington, Ky., and C. Rodman, Newark, N. J.

City Traction Company, Oswego, N. Y.—The City Traction Company, the incorporation of which was noted in the *ELECTRIC RAILWAY JOURNAL* of Feb. 27, 1909, page 393, will take over the property of the Oswego Traction Company, which was sold under foreclosure during the summer of 1908. The directors of the company are C. B. Benson, Minetto; William Nottingham and Clifford D. Beebe, Syracuse, and Harold C. Beatty, Skaneateles. The directors have not yet organized.

Columbus, Delaware & Marion Railway, Columbus, Ohio.—At the annual meeting of the stockholders of the Columbus, Delaware & Marion Railway on March 18, the directors were re-elected and they organized by re-electing the officers. As the fiscal year of the company has been changed to end June 20 in accord with the rules of the Railroad Commission of Ohio, no reports were submitted at the meeting.

Dayton & Xenia Transit Company, Dayton, Ohio.—In answers filed by the defendant a few days ago in the foreclosure suit of the Worcester Trust Company against the Dayton & Xenia Traction Company to the petition of the plaintiff and the intervening petition of the Old Colony Trust Company, most of the allegations were admitted. The Worcester Trust Company holds a balance of \$480,000 of an issue of \$800,000 of 20-year bonds issued by the Dayton & Xenia Traction Company in 1901, while the Old Colony Trust Company holds \$300,000 of second mortgage bonds, the interest on which is in default.

Forty-Second Street, Manhattanville & St. Nicholas Avenue Railway, New York, N. Y.—An order signed by Judge Lacombe in the United States Circuit Court on March 17, makes Frederick W. Whitridge, receiver of the

Forty-second Street, Manhattanville & St. Nicholas Avenue Railway, a party defendant in foreclosure proceedings instituted against that company by the Union Trust Company. The Central Trust Company, which is the owner of 1460 out of a total of 1600 of the second mortgage income bonds of the Forty-second Street, Manhattanville & St. Nicholas Avenue Railway, requested the Union Trust Company, because of default in the payment of interest, to declare the principal sum of \$1,600,000, secured by the mortgage, to be due and payable. A petition to that effect was filed by the Union Trust Company, with the request that Mr. Whitridge be made a party defendant.

Ft. Wayne & Wabash Valley Traction Company, Ft. Wayne, Ind.—At the annual meeting of the Ft. Wayne & Wabash Valley Traction Company, held recently, directors were elected as follows: J. Levering Jones, Randall Morgan, Howard H. Henry and Jno. J. Collier, Philadelphia, Pa.; J. M. Barrett, Ft. Wayne, Ind.; S. T. Murdock and Chas. M. Murdock, Lafayette, Ind.; H. J. McGowan, Indianapolis, Ind. The report of the company for the year ended Dec. 31, 1908, shows as follows: Gross receipts, \$1,322,720; operating expenses, \$737,134; net earnings, \$585,586; deductions, \$488,756; surplus, \$96,830.

Indianapolis, New Castle & Toledo Railway, New Castle, Ind.—Judge Carter, of the Superior Court of Indianapolis, has taken under advisement the interests of all parties connected with the affairs of the Indianapolis, New Castle & Toledo Railway, which is in the hands of the Union Trust Company, Indianapolis, as receivers. Some of the creditors favor the completion of the road and others oppose it. The promoters contributed \$200,000 to the trustee to be used as security for receiver's certificates for the completion of the road. Some of the creditors urge that this fund be distributed among them to satisfy their claims against the company.

Louisville (Ky.) Railway.—The Fidelity Trust Company, Louisville, Ky., has purchased at 97¾ the entire \$1,000,000 of 40-year 4½ per cent second mortgage gold bonds of the Louisville Railway. They are part of an authorized issue of \$2,000,000, \$1,000,000 of which had been previously sold.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—The Mahoning & Shenango Railway & Light Company has made public the following comparative statement of earnings for the years ended Dec. 31, 1908, and Dec. 31, 1907: Gross earnings from operation of company and controlled companies for 1908, \$1,747,927, as compared with \$1,900,662 for 1907; operating expenses (including taxes of operating companies) for 1908, \$1,159,174, as against \$1,140,859 for 1907; net earnings for 1908, \$588,753, as against \$750,803 for 1907.

Maryland Electric Company Railways, Baltimore, Md.—Bioren & Company, Philadelphia, Pa., announce that all of the \$4,000,000 of 5 per cent gold bonds of the Maryland Electric Railways have been subscribed.

Montoursville (Pa.) Passenger Railway.—A. L. Scholl, J. Harry Spencer and Dr. F. L. Moyer, Montoursville, have secured an option on the Montoursville Passenger Railway and the property of the Montoursville Electric Light, Heat & Power Company, owned by the Railways Company General.

New York & Harlem Railroad, New York, N. Y.—The directors of the New York & Harlem Railroad have decided to pass the dividend of 2 per cent usually declared at this time. The property of the company comprises a steam railroad extending from Forty-second Street, New York, to Chatham, and a portion of the New York Central & Hudson River Railroad's terminals—a distance, with branches, of 136.48 miles—and the city or street railway extending from the New York City Post Office to 138th Street, a distance of 0.88 miles. The street railway portion of the system was leased to the Metropolitan Street Railway in July, 1896, and subsequently the lease was taken over by the New York City Railway. Since 1901 the New York & Harlem Railroad and the lessee companies have been in litigation over the State franchise tax imposed upon the New York & Harlem Railroad. The accrued taxes now amount to between \$800,000 and \$1,000,000. The lessee company asserts that the tax should be paid by the New York & Harlem Railroad, and in consequence of the dispute the directors of the New York & Harlem Railroad have decided that it would be advisable to suspend the dividend.

Philadelphia, Coatesville & Lancaster Passenger Railway, Parkersburg, Pa.—The certificate of reorganization of the Philadelphia, Coatesville & Lancaster Passenger Railway as the Christiana & Coatesville Street Railway has been filed at the State Department. The capital stock is

\$400,000, of which W. S. Griest holds \$5,000, W. U. Hensel \$137,500 and J. S. Grayhill \$257,500. The officers are: W. W. Griest, president; C. Edgar Titzel, J. S. Grayhill, A. E. Rauch, W. Hensel Simpson, H. E. Leuft and W. W. Griest, directors.

Public Service Investment Company, Boston, Mass.—Stone & Webster, Boston, Mass., have issued a circular briefly describing the Public Service Investment Company, which they have organized for the purpose, among other things, of holding and dealing in stocks, bonds, notes, or other securities. Its original holdings as listed in the circular include \$350,000 common stock of the Jacksonville Electric Company, \$350,000 common stock of the Minneapolis General Electric Company, \$500,000 common stock of the Houghton County Electric Light Company, \$700,000 capital stock of the Pacific Coast Power Company, \$100,000 preferred stock of the Columbus Electric Company, \$100,000 common stock of the Seattle Electric Company, \$75,000 capital stock of the Tampa Electric Company. Stone & Webster now offer subject to sale the entire \$1,000,000 par value of preferred stock, together with \$400,000 par value of the common stock of the Public Service Investment Company, in blocks consisting of 10 shares of preferred stock and four shares of common stock for \$950.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—The Harris Trust & Savings Bank, Chicago, Ill., is offering for subscription at 98 and interest an issue of \$500,000 of first mortgage 5 per cent bonds of the Salt Lake & Ogden Railway, due Feb. 1, 1934, subject to call at 105 and interest on and after Feb. 1, 1914. The bonds are part of an issue of \$2,000,000, of which \$650,000 are issued to electrify the company's line.

Second Avenue Railroad, New York, N. Y.—Justice O'Gorman, in Special Term, Part I, of the Supreme Court, on March 23 filed an opinion in which he set forth that he can see "no advantage at this time in giving instructions to George W. Linch as receiver of the Second Avenue Railroad." Morris Heimerdinger and other bondholders of the Second Avenue Railroad recently applied to Justice O'Gorman for an order instructing Mr. Linch as receiver to take legal measures to compel the receivers of the Metropolitan Street Railway to carry out that company's lease of the Second Avenue Railroad. Justice O'Gorman said that the mere refusal of the receivers of the Metropolitan Street Railway to assume the obligations of the lease did not terminate it. The Court also said that the public obligation imposed by Section 104 of the railroad law in relation to transfers "did not attach to the receivers."

Third Avenue Railroad, New York, N. Y.—Argument was heard on March 11 by Judge Martin, in the United States Circuit Court, on the application made by the Central Trust Company, New York, N. Y., for a final judgment in the foreclosure proceedings against the Third Avenue Railroad. John M. Bowers, counsel for the Central Trust Company, said that the Third Avenue Railroad had defaulted in the payment of interest on \$37,560,000 gold mortgage bonds. John M. Perry, counsel for the Third Avenue Railroad, contended that the court was without jurisdiction because all parties in the case were citizens of New York State. Mr. Bowers, in reply, said that the insolvency of the Third Avenue Railroad was alleged by the Pennsylvania Steel Company and the Degnon Construction Company in an action brought in the United States Circuit Court, in which action Judge Lacombe had appointed Frederick W. Whitridge receiver of the Third Avenue Railroad, and that this brought the affairs of the company under the control of the United States Circuit Court. Following a continuation of the hearing before Judge Martin on March 23, the Judge said he is satisfied "that this Court has jurisdiction of the case, and as there is no other mooted question the complainant may have its decree."

United Railways Company, St. Louis, Mo.—The directors of the St. Louis & Suburban Railway have re-elected officers as follows: Richard McCulloch, president; John I. Beggs, vice-president; James Adkins, secretary and treasurer; H. B. Taylor, auditor. The directors of the St. Louis Transit Company have re-elected officers as follows: John I. Beggs, president; Robert McCulloch, vice-president; James Adkins, secretary and treasurer; H. B. Taylor, auditor, and Judge H. S. Priest, general counsel.

Winnipeg (Man.) Electric Railway.—A special meeting of the stockholders of the Winnipeg Electric Railway has been called for April 7 to vote on approving a by-law passed by the directors authorizing an issue of \$1,500,000 4½ per cent perpetual consolidated debenture stock and the execution to the British Empire Trust Company, Ltd., of a mortgage securing the stock.

Traffic and Transportation

Hearing on Fares on Boston & Worcester Street Railway

The Massachusetts Railroad Commission continued the hearing on March 18 on the petitions of the selectmen of Framingham and Marlboro for a reduction in the fare unit from 6 cents to 5 cents on the Boston & Worcester Street Railway. W. M. Butler, president of the company, stated that the original locations in Framingham, Southboro and Marlboro, granted in 1907, contained a fare provision. The line extended from Framingham Centre to the Southboro line and a 5-cent restriction applied to the effect that this fare should hold in any direction in Framingham. The company contends now that this 5-cent fare provision is invalid because the selectmen have no power to impose such conditions, subsequent legislation annulling the right of local authorities to fix fares. The selectmen endeavored to make the fare restriction apply to other portions of the system than that covered by the original franchise, extending the restriction to a location never acquired by the company. In 1907, the Boston & Worcester Street Railway secured a location for altering its route in connection with double tracking. This involved a new layout of tracks in the district between Framingham Centre and the Southboro line. The company holds that this physical relocation of the route by a new organization removes the force of the restriction originally imposed, regardless of the right of the selectmen originally to impose a sweeping fare requirement.

Mr. Butler then took up the question of fares in Marlboro. The line now operated by the Boston & Worcester Street Railway in Marlboro covers a location originally granted in 1888 to the Marlboro Street Railway, which ultimately went into the hands of a receiver. The original location contained no provision relative to fares, but in 1894 the city granted the company an extension on provision that the fares within the city limits should not exceed 5 cents. The Boston & Worcester Street Railway holds that the city had no right to impose a fare restriction or condition in connection with a location or extension of a location and cited the case of the city of Springfield vs. the Springfield Street Railway.

G. A. Butman, secretary and treasurer of the Boston & Worcester Street Railway, then stated that the earnings are not sufficient to enable it to pay a 6 per cent. dividend. He submitted tables showing the earnings and traffic in January and February, 1909, compared with the same months in 1908. The 6-cent fare unit was adopted by the road on Jan. 1, 1909. A summary of these figures follows:

	January			February		
	1909.	1908.	Decrease.	1909.	1908.	Decrease.
Revenue passengers.....	554,076	633,124	79,048	555,113	602,934	47,821
Passenger earnings.....	\$29,441	\$30,482	\$1,041	\$29,412	\$29,265	\$147
Car-hours.....	8,420	8,585	165	7,670	8,141	471
Car-miles.....	134,179	135,217	1,047	122,172	127,931	5,759

Chairman Hall stated that the commission has jurisdiction over the reasonableness of the rate rather than over the legality of the franchise restriction, and that it would consider the situation of the company as a whole in going into the matter. The case was then taken under advisement.

Philadelphia Fare Complaint Dismissed

The Railroad Commission of Pennsylvania has dismissed the complaint of D. R. Harper, 3d, against the Philadelphia Rapid Transit Company, that the company was accepting commutation tickets sold at the rate of six-for-a-quarter on one group of lines and declining to accept the same and demanding a straight 5-cent fare on lines entering the subway. Mr. Harper alleged that on the haul from the mouth of the subway at Thirty-fourth Street and Chestnut Street, Philadelphia, to Darby, Pa., route travel and service were identical on both lines and the company was discriminating when it refused to accept "strip tickets" on westbound cars between Thirty-fourth Street and Chestnut Street, Philadelphia, and Darby, Pa. The decision concerned an alleged discrimination. It follows:

"A very careful consideration of your complaint, in connection with the answer thereto, and your reply to said answer, does not convince this commission that that complaint is well founded. It would seem impracticable for the railway company to make any distinction in fares to its patrons on the subway line no matter at what point thereon the cars may be boarded, and the fact that the tracks traversed by the two lines which you compare coincide for part of the distance is an incidental but not controlling factor in the case. In theory, as well as in practice, the fare of a passenger on a street car carries him to the

terminus of that line at the will of the patron. The distinction for which you contend would necessarily apply in both directions, and there seems to be no practicable method, when cars are approaching the subway, of guarding against the strip-ticket passenger entering the subway and continuing his journey thereon. Moreover, in this particular case, the patron has choice of two lines and can select the one on which strip tickets are accepted, so that, unless he wants to enter the subway, there seems to be no reason why he should select that line. When you concede the justice of the straight 5-cent fare on the subway and consider that in general practice no two different rates of fare are ever demanded on the same line, we think you must recognize the impracticability of the operation of any such proposition as you make."

Ohio Electric Railway Reduces Limited Schedule.—On April 19, the Ohio Electric Railway will reduce the schedule for limited cars to one hour between Bellefontaine and Lima, a distance of 33 miles.

Readjustment of Fares Asked on Michigan Interurban.—The City of Kalamazoo has applied to the Michigan Railroad Commission for a reduction of fare by the Michigan United Railways on its lines between Kalamazoo and Battle Creek. It is alleged by the city that the rate from intermediate points to Kalamazoo is greater than to Battle Creek if based on the rate from the point specified to Battle Creek.

Sunday Service on the Winona Interurban Railway.—The Winona Interurban Railway operated its first Sunday car on March 7. Hereafter there will be regular service on Sunday. At present a schedule of one hour is in force. Traffic is reported to be very satisfactory, and is expected gradually to increase in volume as weather conditions become more favorable. The announcement that the company would begin Sunday service was made in the *ELECTRIC RAILWAY JOURNAL* of March 6, page 443.

New Indiana Law Applies to Interurban Railways.—J. F. McClure, of the Indiana Railroad Commission, has ruled that the amendment to the 2-cent fare law which was enacted by the recent Legislature applies to electric railways except for distances covered in incorporated cities where the franchise controls the fare charge. The amendment to the 2-cent fare law provides that when tickets are not bought at a station an extra charge of 10 cents may be made on each trip. In fixing fares under the new provision, the charge shall be according to the nearest multiple of 5 from the product of the rate at 2 cents per mile times the distance. Thus for 13 miles at 2 cents per mile, the charge shall be 25 cents, while for 14 miles at 2 cents per mile, the charge shall be 30 cents.

Baltimore Accident Fakir Sentenced.—David A. Howard, age 28, colored, of Baltimore, Md., who was arrested on Feb. 2, 1909, charged with attempting to defraud the United Railways & Electric Company, Baltimore, Md., out of \$50 by false representation, as mentioned on page 309 of the *ELECTRIC RAILWAY JOURNAL* of Feb. 13, 1909, has been sentenced by Judge Wright in the Criminal Court at Baltimore to nine months in jail. In passing sentence on Howard, Judge Wright said: "This is the third case which has been brought into these courts within the last few months, and it must be stopped. In my observation a large number of cases have been brought into the law courts which have no merit, which tend to block the dockets of those courts and which, in many instances, lead to perjury. I cannot for a moment consider the question of a parole, and Howard must go to jail for nine months."

Ticket Swindle in New York.—The Interborough Rapid Transit Company, New York, recently caused the arrest of three men and a woman who were implicated in a scheme of swindling the company by means of counterfeit subway and elevated railway tickets. The offenders had just started to use the tickets and had a counterfeiting equipment which included a small hand press, two dies, plates, etc. This and some 15,000 tickets were seized by the authorities. The counterfeit tickets were discovered in sorting tickets in the company's office. The plan of those implicated was to sell the tickets at 2½ cents each in lots of 100 and for 2 cents each in lots of 1000. The paper stock on which the counterfeit subway tickets were printed is said to have been a very good substitute for the stock of the regular subway tickets, but the stock of the counterfeit elevated tickets was by no means a good substitute for the stock of the regular elevated tickets. Sentence has not been passed on the counterfeiters.

Funeral Car for Los Angeles.—The Los Angeles (Cal.) Railway has placed in service the first of its new funeral cars, the Paraiso, designed by E. L. Stephens, master car builder of the company, and built under his direction in the company's shops. The car is 34 ft. long. The outside is

finished in pearl gray and gold, with stained-glass windows. The interior is mahogany with upholstering in soft green. There are 20 willow chairs cushioned in green, and a folding willow seat which can be placed in the center aisle to accommodate 10 more passengers. The floor is heavily carpeted. Adjustable curtains are provided with which to form a private apartment for members of a family. The incandescent globes are frosted. The receptacle for the casket is at one end, and there is a door on each side of the car through which the casket may be passed on rollers. Special arrangements are provided above the casket for carrying floral pieces. Another car of the same general design, but somewhat larger, is now under construction, and will be completed about July 1.

Proceedings to Penalize Brooklyn Company.—The Public Service Commission of the First District of New York, on March 16, instructed its counsel to bring suit for the recovery of a penalty provided by statute for failure to obey an order issued by the commission last fall requiring increased service on the bridge local cars operated by the Brooklyn Heights Railroad over the Williamsburg Bridge. The order issued by the commission required the company to operate daily, including Sundays, over every part of the bridge local service a sufficient number of cars past any point of observation to provide during every 30-minute period of the day or night a number of seats at least equal to the number of passengers at that point, the number of cars to be never less than 6 per hour in each direction, except that between 1 a. m. and 5:30 a. m., it shall be never less than 2 in each direction. In the periods in which this provision is not complied with the company was ordered to maintain a minimum service of 24 cars during each 30-minute period.

Hearing on Side-Door Subway Cars in New York.—A hearing was held before Commissioner Eustis, of the Public Service Commission of the First District of New York on March 23, on the question of side doors for subway cars. Bion J. Arnold, consulting engineer to the commission, presented a report covering his observation of the operation of the experimental side-door trains for 10 days. He concluded: "The 10 days' operation of the train confirms my original conclusion that the double-end door car possesses the elements of maximum comfort, decency and capacity that can be obtained with cars that are to be operated in the present subway, and that unless stops at the present curved station platforms are eliminated, the platforms straightened or those stations moved so as to be on a straight track the center door type of car is impracticable." Mr. Arnold recommends that when the side-door cars are again tried the eight cars now equipped be put on as many separate trains so as to accustom the public to their use so far as possible pending the completion of the other equipment of this type. Commissioner Eustis said that the commission was satisfied with the showing made by the train as contained in Mr. Arnold's report, but at the request of A. A. Gardner, counsel for the Interborough Rapid Transit Company, he adjourned the hearing until March 25.

Special Excursion Service.—William B. Wheeler, superintendent of the Westchester Electric Railroad, Mt. Vernon, N. Y., proposes to run a special excursion service this summer. Mr. Wheeler will use the company's regular 12-bench open cars and will advertise the trips by folders to be placed in the hotels, railroad depots, excursion and information bureaus in surrounding cities, and by cards in the regular cars of the company, calling attention to special cars, the cities, towns and villages through which they will pass, and the points of interest along the route. As an instance of the service he has in mind, Mr. Wheeler cites the proposed excursion from the West Farms station of the New York Subway at White Plains Road to Mt. Vernon, via East Mt. Vernon, Pelham Manor, New Rochelle, Tuckahoe, Bronxville and West Mt. Vernon to Bronx Park or West Farms, a distance of 25 miles. Cars will be chartered to parties and special efforts will be made to encourage ladies and children to ride. Conductors will be instructed to point out and announce all places of interest in the different cities, towns and villages as cars pass through them. Saturday, Sunday and holiday riding on special cars will not be encouraged, as regular riding is very heavy on these days. The object in making the special trips during the week is to keep the men and cars occupied on non-rush days. Mr. Wheeler is co-operating with T. C. Perkins, vice-president of the Hartford & Springfield Street Railway, and other managers in an advertising campaign to stimulate vacation and excursion riding, particularly through riding from New York to Boston. Information bureaus will be established in New York, Mt. Vernon, New Rochelle and the principal cities in Connecticut, Massachusetts, Rhode Island and Maine.

Personal Mention

Mr. W. P. Graydon has been appointed master mechanic and superintendent of power of the Western Ohio Railway, Lima, Ohio, to succeed Mr. Malcolm Baxter, resigned.

Mr. L. L. Perry, for some years employed as electrical engineer by F. S. Pearson, D. Sc., has resigned his position. Mr. Perry has devoted his time largely to hydro-electric power house and transmission line work.

Mr. Edward P. Burch, of Minneapolis, is scheduled to present a series of lectures before the department of electrical engineering, University of Minnesota, during March and April on the subject of electric traction for railway trains.

Mr. Charles J. Fifer has resigned as general manager of the Philadelphia, Coatesville & Lancaster Passenger Railway, Parkersburg, Pa., to become general manager of the Columbus, Magnetic Springs & Northern Railway, Delaware, Ohio.

Mr. J. R. Townsend, who recently resigned as electrical engineer of the Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, has been appointed sales engineer of the Detroit office of the Westinghouse Electric & Manufacturing Company.

Mr. John I. Harrington, who has been connected with the Chicago (Ill.) City Railway for more than 20 years, has resigned as claims attorney of the company, and Mr. Charles E. Troxell, formerly assistant claims attorney, has been appointed to succeed him.

Mr. H. E. Buck has resigned as general manager of the Columbus, Magnetic Springs & Northern Railway, Delaware, Ohio, effective on April 1, but will continue as secretary of the company. As noted elsewhere in this column, Mr. Buck will be succeeded as general manager by Mr. Charles Fifer.

Mr. G. K. Jeffries, who has been superintendent of the Eastern division of the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., for three years, with headquarters in Greenfield, has also been appointed superintendent of the Brazil and Danville lines of the company, with headquarters in the Traction Terminal Building, Indianapolis.

Mr. Alexander Gordon, who has been connected with the Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind., at Richmond, Ind., for some time, has been appointed superintendent of the Eastern division of the company to succeed Mr. G. K. Jeffries, whose appointment as general superintendent of the company is noted elsewhere in this issue.

Mr. Charles H. Clark, who from 1901 to 1907 was chief engineer of way, Cleveland Electric Railway Company, is



Charles H. Clark

to return to Cleveland to take up the work which he resigned at the time of the absorption of the road by the Municipal Traction Company. After leaving Cleveland Mr. Clark was connected for about a year with the International Railway Company, Buffalo, as engineer of way, and during the last nine months has been associated with the Andrews and Stanley interests, first on the New York & North Shore Traction System and later as engineer of maintenance of way, Rochester Railway. Mr. Clark has had an extended electric railway experience. A biographical sketch of him was published in the *ELECTRIC RAILWAY JOURNAL* for Sept. 5, 1908.

Mr. O. J. Semmes has resigned as superintendent of transportation and claim agent of the Pensacola (Fla.) Electric Company. Mr. Semmes has been connected with the company 11 years. His first work with the Pensacola Electric Company was in supervising track construction. Mr. Semmes then became foreman of the shops of the company and subsequently entered the operating department.

Mr. C. E. Armstrong, who was recently appointed general superintendent of the Cairo City Gas Company, Cairo Electric & Traction Company and Cairo & St. Louis Railway, Cairo, Ill., was graduated from the University of Illinois in 1905, and entered the service of the Illinois Trac-

tion Company at Danville immediately thereafter. Subsequently Mr. Armstrong was appointed superintendent of the lighting and heating departments of the company.

OBITUARY

John Butterfield, Utica, N. Y., is dead. Mr. Butterfield was a pioneer of the horse car period and was prominent in transcontinental transportation in the early days. He was one of the promoters of the Utica Belt Line, and was connected with the company as superintendent and an officer for many years. He was 82 years old.

Henry Seibert, a prominent resident of Brooklyn, N. Y., has died. Mr. Seibert was for many years connected with the Brooklyn Rapid Transit Company and its constituents and at the time of his death was a director of the Brooklyn Rapid Transit Company, the Brooklyn Union Elevated Railroad, the Coney Island & Gravesend Railway and several other properties leased by the Brooklyn Rapid Transit Company. He was a member of the firm of Henry Seibert & Brothers, but had not been active in business affairs for several years.

Washington F. Willcox, Chester, Conn., who was Railroad Commissioner of Connecticut in 1897 and in 1901, is dead. Mr. Willcox was born in Killingworth, Conn., in 1834, was graduated from Yale Law School in 1861 and practised law at Deep River for many years. He served in the State Legislature and subsequently was elected to Congress. By resolution of the General Assembly of 1907 Mr. Willcox was named as a member of the special public service commission committee, which recently reported favorably on the proposal to create a public utilities commission in Connecticut.

NEW PUBLICATIONS

The Armour Engineer (semi-annual). Chicago; January, 1909. Price per copy, 50 cents; per annum, \$1.00.

The technical semi-annual published by the student body of the Armour Institute of Technology begins its life with a set of valuable articles contributed by the school's alumni. These contributions are all of practical character and their quality and range afford a good criterion of the Armour Institute's instruction courses. H. C. Abell, chief engineer of the American Light & Traction Company, discusses the problems before public service commissions; Morris W. Lee, chief engineer of the Keuffel & Esser Company, describes the reinforced concrete structure his company has built for making instruments of precision; and W. R. Wilson, superintendent of erection, Horgan Engineering Company, tells about his company's gas producers at Gary.

Morrison's Spring Tables. By Egbert R. Morrison. Sharon, Pa.: Morrison & Martin, 1908; 84 pages. Price, \$2.00 net.

This is a hand book of springs for engineers, draftsmen and students. For convenience, the author has divided springs into two classes, heavy and light, considering a helical spring whose bar is less than 1/16 in. in diameter or an elliptical spring whose plate is less than 1/16 of an inch in thickness to be a light spring. The properties of light springs, however, have been arranged under graduated values of the fundamental ratio, so that the property of any light spring may be quickly determined from its particular ratio. The properties of heavy springs are tabulated under each size bar or plate. The work is divided into three parts in their logical order, the first devoted to formulas, the second to mathematical tables and the third to the spring tables.

Social Engineering: A Record of Things Done by American Industrialists Employing Upward of One and One-Half Million of People. By William H. Tolman, Ph.D., with an Introduction by Andrew Carnegie. New York: McGraw Publishing Company; 384 pages; illustrated. Price, \$2 net.

Readers of this paper are familiar with what has been done in this country in the direction of railway employees' club houses, co-operative benevolent associations and pensions, but in other industries welfare work—or one might better say industrial engineering—has been carried much further. Thus Dr. Tolman's book describes the progress made in housing, which has been initiated by several electric railway systems abroad but not in this country, and in systematic hygiene, profit sharing, co-operative purchasing associations and the introduction of safety devices. In the introduction Mr. Carnegie expresses the opinion that the best direction by which to secure an improvement in the condition of the laboring people is through well-directed efforts of individual firms rather than through socialism, although the socialist may often call attention to the evil which the individualist can cure.

Construction News

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

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

RECENT INCORPORATIONS

***Denver & Fort Collins Interurban Railway, Denver, Col.**—Incorporated in Colorado to build an electric railway from Denver via Lafayette, Erie, Longmont and Berthoud to Fort Collins, also to Colorado Springs, Greeley, Golden and Morrison. Capital stock, \$1,000,000. Incorporators: John Olson, Leslie De Remer, Fred O. Olson, Ralph Dougherty, R. E. Inskeep, Demerit E. Brown and Abner Graves.

Middle Georgia Interurban Railway, Atlanta, Ga.—A charter has been granted to this company to build an electric railway, 70 miles in length, between Griffin and Social Circle, with branches to Flovilla and Monticello. Capital stock, \$200,000. Incorporators: Charles F. Howe, Milledgeville; L. W. Roberts, Atlanta, and W. F. Smith, Flovilla. [E. R. J., Oct. 3, '08.]

***Galesburg, La Salle & Kankakee Railway, Springfield, Ill.**—This company has been incorporated to build an electric railway from La Salle to a junction with the Chicago, Indiana & Southern Railroad in La Salle County. Capital stock, \$300,000. Incorporators: William J. Parks and John W. Scott, La Salle; Frank O. Lash, Bloomington, and Harry F. Hamlin and James D. Flood, Chicago.

***Calumet Traction Company, Hammond, Ind.**—This company has been incorporated in Indiana for the purpose of building an electric railway from Hammond to East Chicago, North Calumet and Center. Headquarters, Hammond. Capital stock, \$100,000. Directors: Walter J. Riley, East Chicago; Wm. P. Ijams, Terre Haute; E. L. Keating, Patrick Harrahan and Edward Bailey.

New Orleans & Seashore Railway, New Orleans, La.—This company has been organized and incorporated at New Orleans to carry out the plans of the New Orleans & Seashore Air Line Railway, announced several months ago. It is reported that the New Orleans & Seashore Railway will immediately begin the construction of an electric railway from Amesville, opposite New Orleans, to Grand Isle, La., 55 miles. It is said that practically the same interests which backed the New Orleans & Seashore Air Line Railway several months ago are also behind the new concern, but on account of necessary changes a new charter was filed. This document also gives authority to extend the railway the full length of Grand Isle, and it may build a branch to Bayou Lafourche and along that bayou from Rockport to the Gulf of Mexico. Capital stock, \$2,000,000. Incorporators: James W. Porch, J. H. Menge, Jr., D. W. Benson, Leo A. Marrero and Lamar C. Quintero, all of New Orleans. [E. R. J., July 4, '08.]

***Plattsmouth & Southwestern Interurban Railway, Plattsmouth, Neb.**—Incorporated to build and operate an electric railway from Plattsmouth to Minley and Murdock. Capital stock, \$100,000. Headquarters, Plattsmouth. Incorporators: Charles C. Parmalee, R. B. Windham, H. D. Travis, J. P. Falter and W. W. Coates, all of Plattsmouth.

Eastern Ontario County Electric Belt Line Company, Toronto, Ont.—The bill to incorporate this company, capitalized at \$1,000,000, is now before the Provincial Government. The company proposes to build an electric railway from Lancaster township, running along the St. Lawrence to Cornwall, thence to Brockville, thence northwesterly through to Dundas and Lanark to Darling township, passing through Athens, Lanark, Perth, and connecting with the Lanark Counties Electric Railway, and from Morrisburg through Dundas, Russell and Carleton. C. S. Cossett, Brockville, president. [E. R. J., Dec. 26, '08.]

Mountain Railway, Chattanooga, Tenn.—This company has applied for a charter to build an incline from the property of M. H. Ward, at Mountain Junction, to a point near the Lookout Mountain House. The applicants for the charter are: Boyd Thompson, Charles M. Fox, S. B. Strang, J. S. Fletcher and E. S. Myers. J. V. Williams, Temple Court, Chattanooga, attorney. [E. R. J., Oct. 24, '08.]

FRANCHISES

Colorado Springs, Col.—The City Council has granted the Colorado Springs & Interurban Railway two 17-year franchises, one for the construction of an extension to the Printers' Home and the other for a line to the golf grounds. The company is to have the first line in operation within six months and the second within a year from the time construction is begun.

Elgin, Ill.—The City Council has granted the Elgin, Woodstock & Lake Geneva Railway a 20-year franchise to build its proposed electric railway into Elgin. This route into the city will have its terminus at the corner of Milwaukee Street and River Street, and will be used for freight traffic only. [E. R. J., Feb. 13, '09.]

***New Castle, Ind.**—Mark E. Forkner, a local attorney representing W. L. Davis and L. S. Nichols, Findlay, Ohio, has applied to the City Council for a 50-year franchise to operate a city and interurban electric railway in New Castle.

Vincennes, Ind.—The Vincennes, West Baden & Louisville Traction Company, which proposes to build an electric railway from Vincennes to Jasper via Petersburg, has been voted a subsidy of nearly \$50,000 by Vincennes Township by a vote of 1452 to 799. A. M. Yelton, Vincennes, secretary. [E. R. J., Dec. 19, '08.]

New Orleans, La.—An ordinance has been introduced in the City Council directing the comptroller to advertise for sale at public auction a franchise right-of-way to operate for a period of 50 years a double-track street railway in Franklin Avenue between Pricur Street and Lake Pontchartrain. The franchise is to be advertised for 90 days and will be sold to the highest bidder.

***St. Joseph, Mo.**—I. A. Miller, C. A. Shoup and John E. Dolman have petitioned the County Court to grant them a franchise to construct and operate an electric railway on Ashland Avenue, from Frederick Avenue and Twenty-eighth Street, north and northwest to the Karnes Road, a distance of about 1 mile.

Camden, N. J.—The City Council, meeting as a committee of the whole for the purpose of considering the franchise of the Delaware Tunnel Railroad, on March 10 adopted several amendments which forbid the sale or lease of the franchise without the consent of the city and impose a tax of \$1 per lin. ft. for tracks for 25 years. At the expiration of that time the sum is to be increased to the satisfaction of the City Council or other governing body. The members of the Council were taken over the proposed route on March 15 by Chief Engineer Ashbridge, of the company. The matter of granting the franchise will be taken up on April 8, when the City Council will again meet as a committee of the whole.

New York, N. Y.—A resolution has been adopted by the Board of Estimate granting franchises to the Union Railway to lay double-track extensions to its surface railway in the Bronx, one in Pelham Avenue and the second crossing the University Heights bridge.

***Oklahoma City, Okla.**—It is stated that A. N. Munden, of Munden & Staley, attorneys at law, will apply to the City Council for a franchise for the construction of an electric railway, connecting Oklahoma City and surrounding towns. The petitioners guarantee to build at least 25 miles of the proposed railway in six months following the granting of the franchise and agree to put up a forfeit fund of \$25,000 with the Council in the event the enterprise fails, the money to be withdrawn if the franchise be not granted.

Philadelphia, Pa.—The City Council has repealed the ordinance giving a street railway franchise between the upper end of Frankford to Byberry and Bustleton, which was granted to the Bustleton & Byberry Rapid Transit Street Railway on March 13, 1906. The privilege was then given to the Bustleton & Byberry Street Railway, which was recently organized for the purpose of constructing the railway. It will be about 4½ miles in length. [E. R. J., March 13, '09.]

***Pittsburg, Pa.**—It is stated that within a few weeks the Pittsburg Subway Company will introduce a new ordinance in the City Council providing for the construction of an underground electric railway system. The subway ordinance provides a 50-year franchise, and that the company shall be exempt from taxation for the first 10 years of its operation, after which the city shall receive as compensation for the franchise 1 per cent of the gross receipts for the second 10 years, 2 per cent for the third, 3 per cent for the fourth and 4 per cent for the last 10 of the 50 years. The ordinance provides for a central loop beginning at Grant Street and Oliver Avenue, running underneath that thoroughfare to Liberty Avenue, to Ferry Street, to Third Avenue, to Grant Street, and thence to Oliver Avenue, the place of the beginning. The bill provides for a main branch, beginning at Grant Street and running eastwardly to Fifth Avenue. Another branch is specified to run from the first branch to a right angle to Forbes Street and Brady Street, and still another from the first branch at Bouquet Street and Bayard Street. A. O. Fording is attorney for the company.

Lewisburg, Pa.—The Town Council has granted a primary franchise to the Sunbury, Lewisburg & Milton Electric

Railway to operate an electric railway in Lewisburg. The company has recently applied for a charter to build a railway between Shamokin Dam and Lewisburg. [E. R. J., March 20, '09.]

New Oxford, Pa.—An ordinance has been introduced in the Borough Council for the granting of a franchise to the Hanover & McSherrystown Street Railway to build its proposed railway over certain streets of the borough. W. H. Lanus, president.

Columbia, Tenn.—The Board of Aldermen has granted the Nashville Interurban Railway, which is building an electric railway from Nashville to Franklin, Spring Hill, Columbia, to Mount Pleasant, a month's extension of time in which to complete its railway to Mount Pleasant. H. H. Mayberry, Nashville, president.

Beaumont, Tex.—The Commissioners of Jefferson County have granted a franchise to H. J. Myers and S. A. Price, Dayton, Ohio, for building a street railway system in Port Arthur. The franchise, conferred by the county commissioners, gives the grantees a right of way along, across and upon a width of 22 ft. on either side which they shall select of the public roads of Jefferson county. [E. R. J., March 13, '09.]

Milwaukee, Wis.—The Milwaukee Western Electric Railway has applied to the City Council for a franchise for a street railway with terminals at the west end of the Union depot of the Chicago, Milwaukee & St. Paul Railroad at Fourth Street and Everett Street. The company agrees to have the railway ready for operation in two years and to furnish a \$250,000 bond to perform its part of the contract with the city. The franchise sought from the Council would expire Dec. 31, 1934. A franchise from the Town Board of Wauwatosa has been asked by the same company which desires to enter the city on Lisbon Avenue near Washington park. [E. R. J., March 13, '09.]

TRACK AND ROADWAY

***Greenville-Fillmore Northern Transit Company, Greenville, Ill.**—It is announced that F. A. DeMoulin, E. M. Gullick, A. E. Dunn, Theodore Fisher and Ezra Wright, the directors chosen by those who subscribed toward the preliminary expense of an electric railway from Greenville to Fillmore, have organized the Greenville-Fillmore Northern Transit Company, and elected officers as follows: F. A. DeMoulin, president; Elmer Walcott, vice-president; A. E. Dunn, secretary, and E. M. Gullick, treasurer. About \$2,800 of the desired \$3,000 has been subscribed toward the expense of a survey of the proposed route.

Tri-City & Northeastern Interurban Railway, Moline, Ill.—The stockholders of this company, which has been organized for the purpose of constructing an electric railway line between Watertown and Albany, Ill., have elected the following officers: J. W. Simonson, Port Byron, president; Wm. Ashdown, Coe, vice-president; G. W. Turner, secretary; C. E. Peck, Albany, treasurer. Directors and officers: F. M. Mitchell, Rapids City; E. Cool, Cordova, and James Crowley and C. M. Hodges, Davenport. [E. R. J., Jan. 16, '09.]

Peoria (Ill.) Railway.—This company expects to begin work as soon as permission is obtained from the City Council for a loop to be about a mile in length. In order to handle the added traffic which this new loop will create, a double track will be built in Hurlburt Street for nearly half a mile.

Illinois Inland Electric Railway, Springfield, Ill.—A special meeting of the stockholders of this company, which proposes to build an electric railway to Springfield through Taylorville, Pana and Shelbyville, to Decatur, will be held May 15, in Springfield, the principal office of the company, for the purpose of voting on a proposition to increase the capital stock from \$50,000 to \$2,500,000. [E. R. J., March 6, '09.]

Fort Wayne & Springfield Railway, Decatur, Ind.—Work is said to have been begun by this company on the grade for the southern extension to its railway. A. W. Fishbaugh, chief engineer, is in charge of the work.

Evansville, Mt. Carmel & Olney Electric Railway, Evansville, Ind.—This company has completed the final surveys for its proposed electric railway, which is to extend from Olney to Mt. Carmel, Ill., and to Evansville. The new route, as it is surveyed, will be 64½ miles long, and will run through Highland, Darmstadt, Cynthia, Owensville, Mt. Carmel, Friendsville, Lancaster, Berryville and Olney. [E. R. J., Dec. 19, '08.]

Fort Wayne & Toledo Electric Railway, Harlan, Ind.—R. T. Bastress, Harlan, general manager of this company, writes that this company has been formed for the purpose of building an electric railway, about 55 miles in length, to connect Fort Wayne, Maysville, Ind., Hicksville, Farmer,

Bryand and Montpelier, Ohio. A permanent organization will be formed within a few days. It is the intention of the company to start construction work about May 1. Headquarters, Harlan. Capital stock, \$100,000. [E. R. J., March 13, '09.]

Columbus, Greensburg & Richmond Traction Company, Indianapolis, Ind.—At a meeting recently held in Indianapolis of the stockholders of this company, the following officers were elected: August M. Kuhn, president; R. E. Moore, Indianapolis, secretary; Walter J. Maconaha, Richmond, treasurer. The old board of directors was elected to serve another period. Plans were discussed for taking up the work of constructing the railway from Columbus to Richmond by way of Greensburg. Several committees were appointed with that view and another meeting will be held to receive their reports. The railway as projected would be about 89 miles in length.

***Burkittsville, Md.**—Local citizens are reported interested in a plan to build an electric railway from Brunswick via Horsey's Distillery and Burkittsville to Middletown, Md., about 15 miles, to connect with the Frederick & Middletown Railway. Thomas Hightman was chairman and Chas. T. Maught secretary of a meeting on the subject.

***Cambridge, Md.**—Clarence Morfit, representing the McCay Engineering Company, Baltimore, is said to have begun a preliminary survey for an electric railway which it proposes to build from Cambridge to the Delaware, near Seaford, and from Salisbury to Claiborne. It is said that the enterprise is being promoted by John H. Burgess, Jr., Cambridge, and will be backed by New York capital. The company will operate under a charter granted by the legislature. T. Hughlett Henry, Easton, is counsel for the company.

Chicago, South Bend & Northern Indiana Railway, South Bend, Ind.—This company has awarded to Scheidt & Turner, Elkhart, the contract for the grading of its property at Pine Lake and vicinity.

St. Louis, Creve Cœur & Western Railway, Clayton, Mo.—This company is reported to have placed the financing of its proposed railway in the hands of the Union Finance Company, New York. It is the intention of the company to experiment with both a storage-battery car and a gasoline-motor car. The railway will leave St. Louis on Etzel Avenue and follow the Olive Street road to the upper end of Creve Cœur Lake. It will be double-tracked, and will have about 14 miles of track. [E. R. J., Jan. 30, '09.]

***Macon, Mo.**—It is stated that Henry Funk is promoting a scheme to construct an electric railway from Hannibal to Kirksville. The railway will be midway between the Chicago, Milwaukee & Burlington Railroad and the Quincy, Omaha & Kansas City Railroad. The plan is to build a power plant on Salt River. Current will be furnished for light and power for small machinery. The main line of the road will be about 110 miles, with spurs branching off into the larger towns.

United Railways, St. Louis, Mo.—This company has applied to the Board of Public Improvements for permits to reconstruct a large portion of track on several of the lines.

***Lakewood, N. J.**—It is said that Charles R. Le Compte and James H. Butcher, of Lakewood; R. A. Clark, Joseph W. Johnson, A. C. S. Havens and William K. Blodgett, of Point Pleasant, are interested in a plan to construct an electric railway from Lakewood to Point Pleasant, a distance of 9 miles. It is planned to take over the right-of-way of the Trenton, Lakewood & Atlanta Railway, which is now in the hands of a receiver.

***Rolla, Mo.**—It is reported that E. E. Young, Spokane, Wash., is considering a proposition to build an electric railway from Rolla to Cabool, via Licking and Houston.

***Freehold, N. J.**—It is stated that R. C. Jones and J. Aspinwall Hodge have made a proposition to the Merchants' Association to construct an electric railway between Trenton and Asbury Park. The plan of the promoters is to build either directly to Trenton or connect at Princeton Junction with the Trenton & New Brunswick Railroad.

***Yadkin River Railway, Raleigh, N. C.**—This company has been organized to build and operate, by either steam or electricity, a railway from East Bend to Donaha. W. A. Martin is one of the stockholders.

Valley Electric Railway, Hood River, Ore.—This company has been organized to build an electric railway out the West Side of the valley into the Mount Hood country. Directors: E. T. Folts, W. S. Gribble, G. W. Dimmick, O. H. Bailey, B. F. Gray, A. M. Kelly and H. B. Langille. Officers: E. T. Folts, president; A. M. Kelly, vice-president, and H. B. Langille, secretary. It is stated by the directors that they have already secured a large part of the right-of-way necessary for the completion of the railway, and that

the rest has been promised as soon as the work of construction is commenced. A franchise to operate the proposed railway in Hood River is now pending before the City Council. [E. R. J., Nov. 21, '08.]

Portland Railway, Light & Power Company, Portland, Ore.—This company is considering the advisability of building a bridge across the Willamette River, estimated to cost about \$300,000. No site has yet been selected for the proposed bridge, but it is likely that it will be built across the river either at Washington Street or Salmon Street.

Corry & Columbus Street Railway, Corry, Pa.—This company is said to be making preparations for the extension of its railway to Chautauqua and Union City. The work will be undertaken during the coming summer and the new extension will make a detour through Sugar Grove to Ashville, connecting with the Chautauqua Traction Company's line.

Pittsburg (Pa.) Railways.—It is stated that this company has a plan under consideration for the construction of an elevated spur along Liberty Avenue from Fourteenth Street to Thirty-sixth Street.

Pittsburgh & Suburban Company, Pittsburgh, Pa.—J. Toner Barr advises that this company is making surveys and securing the right-of-way for its proposed electric railway to be built from Pittsburgh to Steubenville via Carnegie, a distance of 40 miles. Capital has been partly secured, but contracts will not be ready for at least a year, as all the necessary franchises have not yet been obtained. F. W. Mueller, Pittsburgh, president; J. Toner Barr, 237 Fourth Avenue, Pittsburgh, chief engineer.

Inter-County Electric Company, Topton, Pa.—It is officially stated that this company will award contracts within a few weeks for the construction of its proposed broad-gage, high-speed electric railway between Lyons and Allentown, 21 miles. All franchises and rights-of-way have been secured, and it is the intention to begin work during April. A number of amusement parks will be reached by the railway. The power station and repair shops will be located at Alburts. The company expects to furnish power both for lighting and manufacturing purposes. Headquarters, Topton. Capital stock, authorized and issued, \$250,000. Officers: Maxwell H. Bochow, Topton, president and general manager; J. L. Hinterleiter, Topton, secretary; Bateman Saddington, Philadelphia, treasurer. [E. R. J., March 13, '09.]

Chambersburg, Greencastle & Waynesboro, Waynesboro, Pa.—It is announced that this company has decided to begin work on the extension of its railway from Chambersburg to the Red Bridge, several miles north, where a park will be established, and another extension to Pen-Mar. Work will also be started shortly on the extension to Shippensburg.

Waynesburg & Monongahela Electric Railway, Waynesburg, Pa.—Organization of this company, which proposes to build an electric railway from Waynesburg to Monongahela, has been effected as follows: Peter Langsdorf, McKeesport, president; Charles Koehler, McKeesport, treasurer; J. Carson Sheldon, Buffalo, N. Y., secretary; W. J. Sheldon, Waynesburg, vice-president and general manager. The board of directors will consist of these officers and James F. Woodward and David Hardy, both of McKeesport. W. I. Coursin, Pittsburgh, has been chosen chief engineer, and W. Edgar Reed, Pittsburgh, consulting electrical engineer. [E. R. J., March 6, '09.]

Tioga Traction Company, Wellsboro, Pa.—A meeting of the officers and board of directors of this company was held recently in Wellsboro for the purpose of perfecting the organization, the necessary amount of stock, \$26,000, having already been subscribed. The company has already applied for a charter. It is stated that work will be commenced next month to secure the right-of-way for the proposed electric railway from Wellsboro through Whitneyville, Catlin Hollow and Covington to Mansfield. The company expects to purchase two 60-ft. interurban, semi-convertible cars. Seventy-pound steel rails will be used on the roadbed. W. A. Seltz, Jersey Shore, Pa., is promoting the railway. [E. R. J., Sept. 19, '08.]

***Cleveland, Tenn.**—J. W. Adams, Chattanooga, is said to have announced that the promoters of the proposed electric railway from Cleveland to Chattanooga, Tenn., have had engineers making a preliminary survey, but a company has not yet been formally organized.

***Amarillo Improvement Company, Amarillo, Tex.**—This company has placed an order with the Illinois Steel Company for 300 tons of steel rails to be used in the construction of the proposed street railway to San Jacinto Heights.

Twin City Light & Power Company, Chehalis, Wash.—This company has filed for record a mortgage for \$400,000,

with the Merchants' Savings & Trust Company, Portland, Ore., trustee. The company proposes to build an electric railway between Chehalis and Centralia. It has already purchased the lighting plants in both cities. [E. R. J., March 6, '09.]

Columbia & Walla Walla Traction Company, Walla Walla, Wash.—It is reported that negotiations are under way between this company and W. S. Mathias, Spokane, representing a company composed of Eastern and local capitalists, for the purchase of the railway company's property. It is stated that the new company will take over the franchise and right of way of the original organization, and will begin active work on the road April 1. Bids are now open for grading work, and as soon as a contract for this has been completed, it is announced that a force of men numbering about 200 will be put in the field with Walla Walla as headquarters. [E. R. J., Jan. 16, '09.]

Morgantown & Dunkard Valley Railroad, Morgantown, W. Va.—It is stated that this company has about 3 miles of roadbed graded and expects to begin laying track about April 1. This electric railway is proposed from Morgantown, W. Va., via Granville, Randall, Barker, Cassville, Core, Pentress, Blacksville and Wadestown, W. Va., which is 30 miles, with a branch of about 5 miles to Mt. Morris, Pa. The company has a franchise from the County Court for a right-of-way along the county road; also rights-of-way from most of the land owners along the proposed line. J. A. Martin is the engineer in charge. It is said that the company will not build by contract. [E. R. J., Nov. 28, '08.]

SHOPS AND BUILDINGS

Denver City Tramway, Denver, Col.—It is stated that this company is preparing plans for the erection of a new passenger station, connecting with the present loop, at the southeast corner of Fourteenth Street and Lawrence Street. The plan is also said to include a new union station, executive building, car house and depot for its interurban business, which will take in nearly the entire block from Lawrence Street to Arapahoe Street and from Fourteenth Street to Fifteenth Street.

Illinois Traction System, Champaign, Ill.—It is stated that this company is about to commence the construction of a 48-ft. x 300-ft. wood mill, brass foundry and some other additional buildings adjoining the company's shops at Decatur. Considerable new wood working machinery will be installed and improvements will be made in the main erecting and machine shop since the wood working shop will be removed from that building.

Winona Interurban Railway, Winona Lake, Ind.—Plans and estimates are being prepared by this company for the construction of a new passenger and freight depot at New Paris.

Syracuse, Lake Shore & Northern Railroad, Syracuse, N. Y.—This company has engaged Sheaff & Jaastad, Boston, to prepare plans and specifications for a car house and for a machine and repair shop to be used by the Auburn & Syracuse, the Rochester, Syracuse & Eastern, the Syracuse & South Bay and the Syracuse, Lake Shore & Northern Railroads. The building will have accommodations for 60 cars, and it is proposed to use it almost exclusively for the Syracuse, Lake Shore & Northern Railroad. The building will be of fireproof construction, steel and concrete being the principal structural materials.

Northern Ohio Traction & Light Company, Akron, Ohio.—The car house of this company at Cuyahoga Falls, together with two cars, one the private car Josephine, was destroyed by fire on March 9. The loss is estimated at over \$20,000.

Lakeview Traction Company, Memphis, Tenn.—This company has purchased the Young Men's Christian Association Building, 80 ft. x 200 ft., and will make a number of improvements to it in order to use it for an interurban depot.

POWER HOUSES AND SUBSTATIONS

British Columbia Electric Railway, Victoria, B. C.—It is reported that this company is considering plans for the erection of a power plant on the Jordan River near Victoria. R. H. Sperling, Vancouver, general manager.

Augusta Railway & Electric Company, Augusta, Ga.—This company is said to be arranging for proposed improvements to its power plant on Augusta Canal, including the installation of an auxiliary steam plant and improvement of water power machinery. James R. League, general manager.

Charlottesville & Albemarle Railway, Charlottesville, Va.—This company has recently purchased one 150-kw General Electric generator and a 500-hp Corliss-Nagle engine. R. R. Case, general superintendent.

Manufactures & Supplies

ROLLING STOCK

Grand Rapids (Mich.) Railway has ordered 12 cars from the St. Louis Car Company.

Sioux City (Ia.) Traction Company is reported to be planning to purchase six cars.

Saginaw & Flint Railway, Saginaw, Mich., is reported to be in the market for two more cars.

Syracuse & Suburban Railroad, Syracuse, N. Y., is reported to be in the market for three interurban cars.

St. Joseph Railway, Light, Heat & Power Company, St. Joseph, Mo., has ordered five cars from the American Car Company.

Vancouver (Wash.) Traction Company has ordered one 28-ft. semi-convertible car from the American Car Company.

Omaha & Council Bluffs Street Railway, Omaha, Neb., has placed an order with The J. G. Brill Company for 25 sets of trucks.

Springfield (Mo.) Traction Company has purchased two second-hand 27-F Brill trucks from the Dorner Railway Equipment Company, of Chicago.

Quincy Horse Railway & Carrying Company, Quincy, Ill., has placed an order with the American Car Company for eight Brill standard 10-bench cars.

Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., contemplates installing parlor cars on its lines, and is asking for bids on about 6 cars of this type.

Westchester Electric Railroad, Mount Vernon, N. Y., recently had 25 of its cars equipped with side doors for vestibules by J. P. Sjoberg & Company, of New York.

Chicago, Lake Shore & South Bend Railway, Michigan City, Ind., has just received from the Russell Car & Snow Plow Company, Ridgway, Pa., a size 1, single-truck snow plow, with flanger.

Mississippi Valley Interurban Railway, Springfield, Ill., noted in the *ELECTRIC RAILWAY JOURNAL* of Dec. 26, 1908, as contemplating the purchase of 10 or 12 interurban cars, advises that it is preparing to order at once.

Chicago & Milwaukee Electric Railway, Chicago, Ill., is in the market for 12 pay-as-you-enter cars to have 34-ft. bodies and an over all length of 49 ft. These cars are to be used on the company's lines for city service at Milwaukee.

Marquette County Gas & Electric Company, Ishpeming, Mich., has purchased through the Dorner Railway Equipment Company, Chicago, four second-hand, 21-ft. trailer cars. The cars were originally built by the Pullman Company for the Chicago Union Traction Company.

Municipal Tramways of Calgary, Alta., has made up practically the same specifications for the four cars ordered from the Preston Car & Coach Company, as for the 8 purchased from the Ottawa Car Company, mention of which was made in the *ELECTRIC RAILWAY JOURNAL* of March 13, 1909.

Northern Ohio Traction & Light Company, Akron, Ohio, has placed an order with the G. C. Kuhlman Car Company, of Cleveland, for a new private car for Henry A. Everett, which will be a reproduction of the old car Josephine (destroyed by fire recently), with a number of improvements. The car will be 52 ft. long, and will be fitted up with dining-room, kitchen, parlor and observation apartments, the same as the old one.

Indiana Union Traction Company, Anderson, Ind., has purchased five open and three closed second-hand trail cars from the Dorner Railway Equipment Company. These cars, which were formerly used on the lines of the Chicago Railways, will, it is said, be used on the city lines at Muncie and Anderson. The Indiana Union Traction Company also purchased from the Dorner Railway Equipment Company four Westinghouse No. 56 motors and three Peckham trucks.

Chicago & Southern Traction Company, Chicago, Ill., mentioned in the *ELECTRIC RAILWAY JOURNAL* of Jan. 2, 1909, as contemplating the purchase of six or seven trail cars for interurban service, has placed an order for four enclosed trailer cars with the Niles Car & Manufacturing Company. The cars are to be delivered on May 15, 1909. They are to have the following length: Over-end plate, 36 ft. 6 in.; over vestibule, 46 ft. 6 in.; overall, 47 ft. 10 in. Special equipment specified are Baldwin trucks and Hale & Kilbourn rattan seats.

Ogden (Utah) Rapid Transit Company, noted in the *ELECTRIC RAILWAY JOURNAL* of March 20, 1909, as having purchased four cars from the Cincinnati Car Company, ad-

vises that the cars will be of the semi-convertible type, with a seating capacity of 40, an overall length of 41 ft., a length over vestibules of 40 ft., and a body length of 28 ft. Other specifications follow:

Weight of car body.....17,780 lb.	Headlights	Dayton
Width inside.....8 ft.	Motors, type and number,	4 GE-80
Over all.....8 ft. 5 in.	Registers	Ohmer
Height inside.....8 ft. 2 in.	Roofs	seven plank
Sill to trolley base.....9 ft.	Sanders	Nichols-Lintern
Underframe	Seats..	Cincinnati Car Com-
Air brakes.....National "A"	pany	
Brakes	Sterling	
Couplers...Van Dorn No. 5	Step treads	Stanwood
Destination signs...Hunter	Trolley poles and attach-	
Fenders or wheelguards	ments ..	General Electric
Berg sliding	Trucks, type and make	
Heating system.Consolidated	Standard o-60	

TRADE NOTES

Allis-Chalmers Company, Milwaukee, Wis., advises that it has received the order for air brakes to be applied on the 18 cars for the Conestoga Traction Company of Lancaster, Pa., recently purchased from The J. G. Brill Company.

National Brake & Electric Company, Milwaukee, Wis., announces that A. C. Loose has been appointed purchasing agent. Mr. Loose will combine the duties of that office with those of his present work as advertising manager of the company.

United States Brake Shoe Company, New York, N. Y., has recently established a foundry at Pittsburg, Pa., from which it will be able to deliver brake shoes. The foundries of the company now are at Walton, N. Y.; Corry, Pa., and at Pittsburg, Pa.

W. N. Matthews & Bro., St. Louis, Mo., are perfecting a ratchet wrench to be used to facilitate installing the gey anchors which they manufacture. By the aid of this wrench the anchor can be set at angles and in places which were formerly impossible. The firm exhibited the wrench at the last annual convention of the American Railway Engineering & Maintenance of Way Association at Chicago.

Western Electric Company, New York, N. Y., reports that its February business was at the rate of about \$45,000,000 a year, about 15 per cent ahead of the corresponding month a year ago and the first quarter of the company's fiscal year which ended Feb. 28, 1909, ran about 30 per cent ahead of the first quarter of 1908. The increase in the number of the customers on the books of the company was 40 per cent.

Root Spring Scraper Company, Kalamazoo, Mich., announces that it is now making the Root spring scraper for street and interurban railways, formerly manufactured by the Root Railway Supply Company. The Root Spring Scraper Company was organized recently to continue the manufacture of this scraper, and F. N. Root, its inventor, will have charge of the manufacture and sales. Mr. Root advises that he has made several improvements in the device.

Rabok Manufacturing Company, 104 South Commercial Street, St. Louis, Mo., has made very extensive tests of its "Liquid Carbon" paint and has secured some strong testimonials from managers of railroads, street car builders, steel constructors and metal workers as to the excellent properties of this product. "Liquid Carbon" is claimed by the manufacturers to be impervious to acid, climatic conditions, sulphuric fumes and gases. It is being especially recommended for use on railway bridges, steel smokestacks and roofings and steel cars and for all purposes where it is essential to preserve the metal.

McKeen Motor Car Company, Omaha, Neb., advises that two more of its standard 55-ft., 75-passenger, all-steel, 200-hp gasoline motor cars, coupled together and moving independently, left Omaha on March 19 en route to California, where 15 of this design car are in service on the branches of the Southern Pacific and private lines. This is the sixth shipment of McKeen cars to California in less than a year, and all made the trip on their own wheels and under their own power. Altogether, there are 40 of these cars in use in the United States, and 25 additional cars are under construction. Several of these cars have been adopted for interurban lines on account of the small initial investment and the cheapness of operation. Five of the new 70-ft. cars, which seat 105 passengers, are also on order. C. B. Smyth has resigned as assistant mechanical engineer of the Union Pacific Railroad to become superintendent of the McKeen Motor Car Company, Omaha, Neb. The Santa Fé Railroad has ordered two all-steel gasoline motor cars from the McKeen Motor Car Company.

Union Switch & Signal Company, Swissvale, Pa., has been awarded a contract for the installation of alternating

current automatic block signals between the Raunt and Far Rockaway, on the Rockaway Beach Division of the Long Island Railroad. This is an extension of the system of automatic signals that is already in service in connection with the Atlantic Avenue improvement electrified zone of the Long Island Railroad, extending out on the Rockaway Beach division to the Raunt. This system will be different from the large contract executed by the Union Company in connection with the Atlantic Avenue improvement work from Flatbush east, put in service two years ago, inasmuch as the signals will be operated with alternating current motors and lighted by alternating current from the transformers, taking current from the 2200-volt alternating-current signal mains. This installation involves 29 two-arm home and distant style "B" electric motor signals and 16 electrically slotted mechanical home signals with special control at interlockings, including annunciators and indicators, etc.

ADVERTISING LITERATURE

D'Olier Engineering Company, New York, N. Y., announces Catalog "T" on horizontal centrifugal pumps.

Western Electric Company, New York, is distributing a booklet on its automatic intercommunicating telephone.

American Blower Company, Detroit, Mich., has printed a handbook on boilers and exhausters for forges and furnaces.

Keystone Lubricating Company, Philadelphia, Pa., has printed a pamphlet on high-grade petroleum grease lubrication.

Harry de Steese, New York, has issued a folder explaining his facilities for coil and commutator manufacture and repair.

Thomas Paulson & Son, Brooklyn, N. Y., are sending out a folder descriptive of the Hecla anti-friction bronze, brass and bronze castings and Babbitt metals.

W. S. Barstow & Company, Engineers, New York, N. Y., have published an attractive pamphlet descriptive of the Oregon Electric Railway system, constructed under their supervision as constructing engineers. The pamphlet is entitled "Bulletin No. 21."

Green Engineering Company, Chicago, Ill., is sending out catalog "G," describing the Green chain grate stokers. A valuable feature of the publication are the tables giving the properties of the bituminous coals of Ohio, Illinois, Pennsylvania, Indiana, Kentucky and other States.

Breinig Construction Company, Terre Haute, Ind., is distributing circulars describing the novel riding devices which it makes for park service. Among them are "The Jollier," a coaster having tub-shaped cars; the circle dip or scenic coaster, figure 8 coasters, scenic railways and dip the dips.

Keufel & Esser Company, New York, N. Y., has published a very extensive catalog showing the drafting instruments, drawing materials, surveying instruments, slide rules, precision instruments and other of their manufactures and importations. A special section is devoted to drafting office furniture.

American Ship Windlass Company, Providence, R. I., has published a comprehensive illustrated study of the principles and operation of the Taylor gravity underfeed stoker. The selling agent for this stoker in New York, New Jersey and Pennsylvania is the Lenher Engineering Company, New York.

George H. Gibson Company, New York, N. Y., has published a neat calendar and blotter entitled "Fear Not to Sow." This firm advises manufacturers of engineering supplies and equipment to prepare the way for large sales during the resumption of business by means of intelligently directed educational publicity.

The Nelson Valve Company, Philadelphia, Pa., has prepared an elaborate 220-page, cloth-bound catalog, showing its great variety of valves, including gate, globe, angle and check valves, in various metals. Among the new types shown are bronze swing check valves and hydraulically and electrically operated gate valves. Test and working pressures are given throughout to help the user in selecting the valves most suitable for his service.

Goldschmidt Thermit Company, New York, N. Y., has issued a revised edition of its pamphlet "Shop Instructions for the Use of Thermit in Repair Work," which was first issued in February, 1908. Important additions have been incorporated in the present pamphlet and considerable matter which appeared in the former edition has been omitted. All new matter has been printed in heavier type in this pamphlet, making it a simple matter to determine what changes have been made. Directions for welding motor cases and repairing flaws in castings are now printed separately.