Electric Railway Journal

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WHY NOT INVESTIGATE THE INVESTIGATORS?

A sequel to the investigation which has been conducted by the Public Service Commission of New York, First District, by the Thompson legislative committee is the charge that the committee has maintained at least an indifferent guard against the squandering of public money appropriated for its use. Whether guilty or not, the committee has created in the public mind a presumption of its guilt by its attitude in regard to the statements which have appeared in the daily press. For instance, the plea has been offered that a "petty disagreement" over a hotel bill should not be allowed to obscure the main issue of uncovering graft, and that an investigation of the expenditures made by other legislative committees would show infinitely greater abuses than in the present case. If this is true, we believe that it is high time that the system of accounting conducted by the State be changed, and that a committee be appointed to investigate the expenditures of the investigating committees, of which many have been appointed by the Legislature during the last few years.

DEATH OF JOHN A. HILL

One of the striking features in the industrial development of this country during the past two decades is typified in the improvement in character and the extension of influence of the trade and technical press. John A. Hill, who died this week in New York, was one of the foremost leaders in this advancement. He was always a strong advocate of high ideals in technical journalism and constantly practised what he preached. He was a believer in the maintenance of the editorial standards of his publications. To him the primary obligation of a class paper is to its readers, and he believed that its advertisers benefit in direct ratio to the respect in which a publication is held by its subscribers. He was one of the first to insist that the advertiser had the right to know the exact paid circulation of every periodical in which he was asked to spend his money. It is not many years ago that the subscription list of numerous class journals was practically a sealed book to its advertisers and was more or less surrounded by mystery. Now practically every periodical not only solicits inspection of its subscription list and subscription methods but publishes in each issue a statement of the exact circulation. Another direction in which Mr. Hill's influence on trade publications was beneficial was in his insisting in his own papers upon greater attention to better typographical and mechanical execution. Originally a printer and mechanic, this side of journalism appealed to him with great force. He never hesitated to change methods where improvements could be made, and the improved condition of all American technical papers of the present day has been in a large measure due to his efforts in this direction. The business press of the country will long remember and respect the methods, the strong personality, the high ideals and the sterling honesty of John A. Hill.

PROPOSED CHANGES IN THE CONSTITUTION

The correspondence between the committee appointed to consider the recommendations of Past-President Allen and the executive committee of the Manufacturers' Association has been printed by the latter and is being sent this week to all of the members of the Manufacturers' Association. It is published on another page of this issue with the resolution adopted by the Manufacturers' special committee and indorsed by the Manufacturers' executive committee disapproving the plan of one association. We also print this week a letter from Mr. Brady, chairman of the American committee making the recommendations, a statement setting forth the reasons, in his opinion, which favor a single association. Our readers have, therefore, before them both viewpoints. The entire subject is to be considered at the mid-year meeting of the association at Chicago, when it is to be hoped a satisfactory conclusion will be reached. There is no doubt, as Mr. Brady says, that the questions now before the industry are very much larger than they were ten or fifteen years ago, and that the proper solution of these problems is of equal importance to electric railway owners and operators and to electric railway manufacturers. If any proof was needed of the necessity of such action, it is given by the statistics in our issue of Jan. 1, which showed a far smaller increase in miles of track built and cars ordered by city and interurban railway companies than during any similar period for many years past. In some important States there was practically no construction, as in Massachusetts, which reported only 1.09 miles of new track, and New Jersey, which reported only 1.97 miles of new track. Anyone who is acquainted with the conditions of the industry, however, does not require statistics to be convinced of the seriousness of the situation from the standpoint of both the manufacturer and operator. There are many ways in which the manufacturers can be of help if they will take a more active participation in the counsels of the association. According to Mr. Brady's letter, the proposed amendments to the constitution are not perfect, and it may be that some better plan of securing the result hoped for may be found. We are strongly convinced of the importance of a greater co-operation be-

tween the manufacturing and operating sides of electric railways and that the more real this co-operation and spirit of mutual service are, the better it will be for the industry. Whatever plan is adopted the standard set should be united effort in a program that appeals to all.

WHAT IS GOOD SERVICE?

In the criticisms which appear in the daily press on electric railways, the charge is sometimes made that such and such a company is not giving "good service." But before the public can validly charge an electric railway with not giving "good service," it must define in words more clear than generalities what it means by the phrase.

For instance, to one person the words "good service" may mean a condition that during rush hours, as well as at other times, every passenger should have a seat, or it may mean that when he gets to a corner and wants to take a car the car is ready there for him. If taxicab service is what the public expects from the electric railway, it is obviously impossible to satisfy this expectation. There are many kinds of transportation service, and different agencies are organized to furnish the different varieties. Each may be said to give "good service" so far as it meets the requirements of its specialty.

Good taxicab service consists in having comfortable cabs available for instant call by any prospective passengers anywhere in the territory served; in providing skilled drivers who can safely and expeditiously deliver the passengers to their destinations, and in doing this at a rate of fare commensurate with the expense involved. To expect an approximation to taxicab service at a 5-cent fare is so ridiculous as to be unthinkable, and yet there is a tendency on the part of the public to consider the service which is desired regardless of the rate of fare charged.

Good electric railway service may involve occasional standing in the car, walking 100 yd. along the car line to the nearest stopping point, waiting five minutes for a car at certain hours of the day, even if an important business engagement has to be met, and other slight inconveniences incidental to railway operation under practical conditions. On the other hand, when the public understands that seats for all cannot be furnished at all hours of the day and night, that the location of stopping points a reasonable distance apart conduces to good schedule speed, that the headway has to be adjusted to the density of traffic, which varies from hour to hour, etc., then the complaints will be less frequent, and "boosting" as well as "knocking" will be heard in the land.

It might be well, in the advertising which electric railways do, to devote considerable space to definitions of "good service," so far as electric railways are concerned. Explanations on this point may lead to a clearer understanding on the part of the thinking public as to what "good service" as given by an electric railway really means.

ULTRA-HIGH STEAM PRESSURES

The commencement of work on the new high-pressure steam power station of the Public Service Company of Northern Illinois, as outlined on another page, marks an important step in steam-generating methods. Higher steam pressures of late have been the subject of a great deal of discussion, and plans have been made in several cases to prepare for them when they arrive, but aside from this, remarkably little evidence of a change in practice has been noticeable for a long time. During the past five years, in fact, attention has been devoted almost exclusively to the elaboration of high-capacity operation for steam boilers with incidental consideration to increasing the physical size of boiler units. With the Northern Illinois plant, however, comes a combination of all of the most modern ideas in central station design, not the least noticeable of which is a 350-lb. working steam pressure.

This is, of course, by no means an ultra-radical innovation, even though the highest pressures for stationary plants have remained at about 200 lb. for a couple of decades. In marine practice higher pressures have not been unusual, and at one time even steam locomotive practice evidenced a distinct tendency to go beyond this figure. In the latter case, however, there was a reaction in the advance that possesses at least indirect interest in connection with the present move toward higher pressures in stationary installations. This reaction came about through the enormous increase in maintenance costs that was caused apparently by the relatively small rise in pressure from 200 lb. to, say, 225 lb. It was demonstrated, in fact, that the gain in economy accompanying the higher pressure was far more than offset by decreased reliability and much more costly repairs. In consequence many engines were built for the lower steam pressure, and to-day it is extremely unusual to find a new locomotive which is designed for a pressure of more than 200 lb., while 180 lb. is very common.

Of course, the flat sheets and exposed tube ends of the locomotive boiler impose upon it limitations that do not exist in the case of stationary installations. Nevertheless, it is likely that the general principle of increased repairs with increased pressure will apply to some extent in every instance, and therefore, not all of the economy of the greater temperature range for the prime mover made possible by the higher pressure is going to be net profit. However, there is no doubt that the high-pressure steam will be profitable, and in view of the fact that there is nothing really experimental about its use to the extent involved in the plant in question, satisfactory results from it may be said to be a foregone conclusion. Whether this installation is to be followed by others with still higher pressures until a figure of 600 lb. or 700 lb. is reached is by no means so certain. These pressures have been proposed periodically since Thurston explained their promise of economy in the late nineties, but it must not be forgotten that the temperatures of steam at such pressures plus enough superheat to make it suitable for most advan-

tageous use in all the stages of a turbine bring the initial temperature to a point approximating red heat and may well involve more expense for its control than can be gained from the increased temperature range.

CAUSES OF RAIL CORRUGATION

The cause of rail corrugation is a subject so old that it becomes perennially new, and that there is just as much interest as well as mystery as ever about the cause of this peculiar wear is shown by the number of letters which we have published on the subject within the last three weeks. In the current issue one prominent engineer gives his reasons for believing that the cause of rail corrugation is the character of wheels used rather than the shape of the rail. He cites the interesting fact that one division of his line was free from corrugation when cast-iron wheels were being employed, but with the introduction of the steel wheel, the other conditions remaining the same, corrugation immediately appeared. Later the same thing happened on another division of his lines. On the other hand, the engineer of maintenance of way on another very large property, in a letter also in this issue, agrees with the first writer only in rejecting the theory that the shape of the rail determines the extent of corrugation. He gives reasons for attributing this peculiar wear to the hardness of the modern rail.

The electric railways in this country are not the only ones on which rail corrugation has been noted. It has attracted as much, or even more, attention abroad, or had before the commencement of the war. The Germans, especially, had made a study of the subject through their own association as well as through a special committee of the International Street & Interurban Railway Association. The war has naturally interrupted these studies, but according to one of the last reports of the International committee, the rigidity of the rail support has a great deal to do with the production of corrugation, and among the remedial measures tried one went even to a slotting of the web to give a more flexible support. Another theory advanced abroad, and which had a number of supporters, was that the primary cause lay in the chattering of the rolls when the rails were in the mill, that a careful examination would even disclose evidences of minute corrugations in new rails before they were laid, and that the operation of the cars served simply to develop and accentuate these incipient waves and crests on the rail surface.

In view of the wide interest in this matter and its importance to railway companies, we believe, as we said in the issue of Dec. 25, that the subject is one which could very profitably receive careful consideration by the committee on way matters of the American Electric Railway Engineering Association. All of the theories which have been advanced to explain the cause of rail corrugation cannot be true. But perhaps one reason for their large number is that it is about as difficult to prove any of these theories to be wrong as to prove them to be right.

FARE INCREASES AND A REASONABLE RATE OF RETURN

An electric railway which has secured permission from the proper regulating tribunal to raise its rates after a hard struggle to make both ends meet has by no means always before it a clear-cut road to prosperity. Its future then becomes a business question. Since the public must in the long run pay the cost of the service which it uses, the people at large must meet every authorized fare increase without any serious diminution of patronage.

There are economic limitations of rates beyond which no regulative authority can act, and they are set by the value of the service to the public. The fact that a commission declares itself in favor of a reasonable return by no means insures such a return, and the United States Supreme Court itself cannot guarantee the business success of a public service corporation by setting forth its recognition of the right of honestly-invested capital to its reasonable compensation. External controlling influences must come into play upon utility finances before the reasonable return can be received by the investor, and among the factors which have to be considered in the free establishment of rates are the existence or prospect of competition, development of private means of transportation, purchasing power of the individual, necessity for the service, possibility of reducing expenses, proportion of revenue devoted to taxation, and other items.

On the operating side, certainly running expenses, bond and note interest and depreciation must be covered by the rates if an enterprise is to exist on the barest economic margin. Failing, such rates, or revenue rather, a receivership looms near, unless outside support can be had. There may be cases occasionally where the economic need of a utility was not sufficient to justify its construction and where competition or other conditions will not permit rates sufficient to meet the interest charges, and on such roads a receivership is inevitable. On other roads not so badly situated, after a fair trial of the increased rates, the only possible course is to wait for the gradual development of the territory, keeping expenses as low as is feasible, cultivating every vestige of latent traffic, and seeking so far as possible to ease some of the burdens of taxation, accident cost, assessments for local improvements and reconstruction of road and equipment.

Not for a single moment do we desire to belittle the immense importance of securing authority after clear demonstration of the need to make rate increases, but we do wish to point out that some of the considerations above outlined explain the hesitation of many able managers from applying to their respective commissions for permission to establish higher fares on a scale which arithmetically provides the 6, 7 or 8 per cent return which they look upon as reasonable for their properties. Rate increases are needed by numerous roads, but if anyone thinks that with a higher fare unit the financial worries of all railway men will disappear, he is risking a good deal of disappointment.

Bay State Carhouse at Lowell

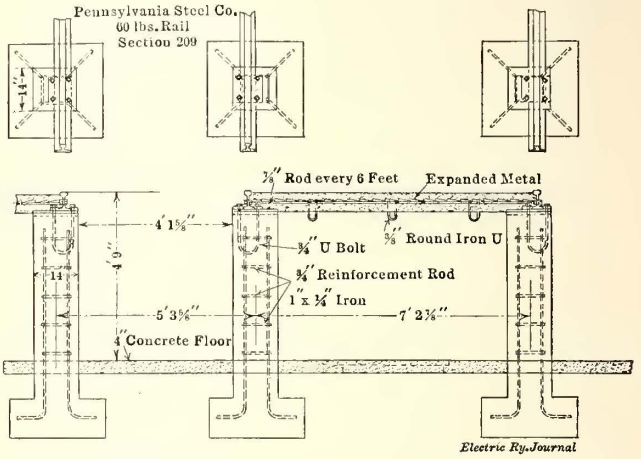
Main Features and Detailed Costs of One of the Most Modern Carhouses on the Bay State Street Railway's System—It was Built to Accommodate Eighty 40-Ft. Cars at a Total Investment of Less Than $1,000 per Car, Exclusive of Real Estate

ONE of the latest carhouses of the Bay State Street Railway is located on Middlesex Street, Lowell, Mass., adjacent to the company's local power plant and additional to an existing carhouse and shops. The building has a capacity of eighty 40-ft. cars, with ample room for extension when it becomes necessary. It is a combination of brick construction with concrete floors and foundations, and was designed by the equipment department of the company. The cost was $77,110 exclusive of real estate, and the building contains a small shop for light repairs and inspection service in addition to quarters for the local line and track departments, a stock room and a sand-handling plant.

Over all the building is 280 ft. 6 in. x 145 ft. It contains ten parallel tracks, seven being provided with pits, and is divided into three sections separated by brick fire walls 12 in. thick. It is one story in height, there being no basement except a compartment containing a Gurney hot water heater and coal bin. The area under the floor between pits is open to a depth of 4 ft. 9 in. The piers are of reinforced concrete, and the floor of the pit section is 4 in. thick, the main floor of the carhouse being 6 in. thick and reinforced with expanded metal. The roof is of six-ply tar and gravel on timber supports, and is provided with the usual extension fire walls, these being carried from 5 ft. to 6 ft. 6 in. above the roof and about 5 ft. beyond the end.

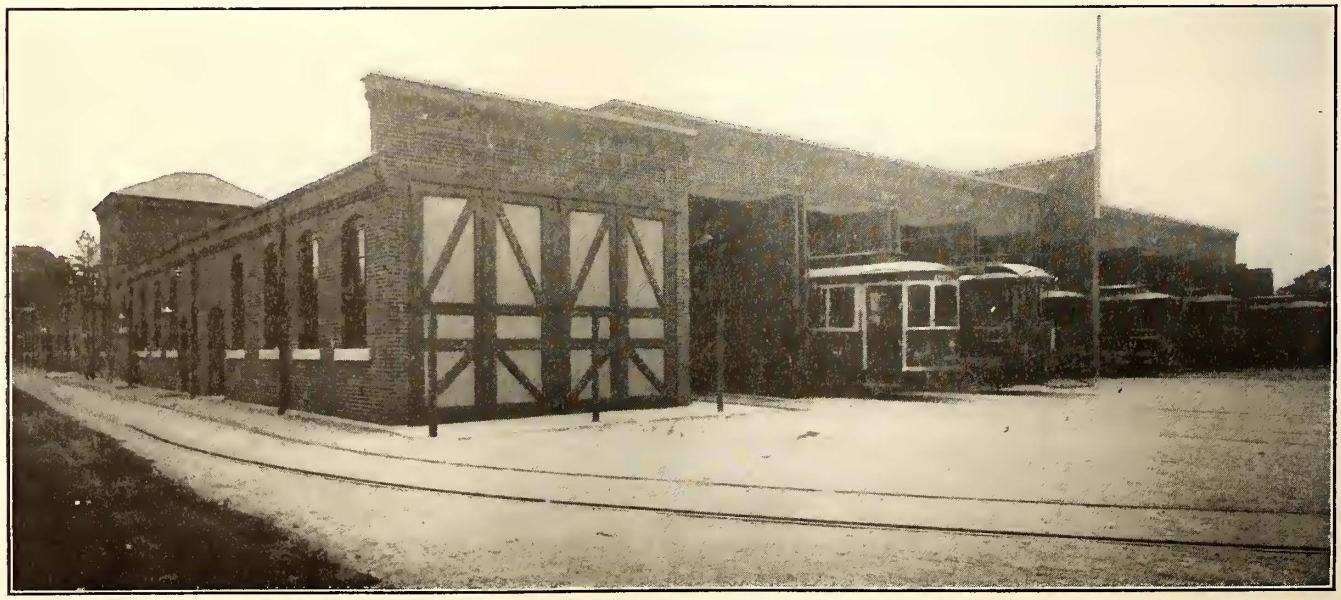
All pits are 200 ft. long and about 4 ft. wide between piers, with drainage toward a central duct system discharging into a brook near the building. The house tracks are of 60-lb. T-rail carried on cast-iron plates at the piers and clamped to the plates by ¾-in. U-bolts as illustrated. The piers are 7 ft. apart on centers, and located opposite each other, being 12 in. x 14 in. in section. The outside walls are 16 in. thick, and wooden swinging doors are provided at the end of each track. The yard tracks are connected with the double-track main line by four spurs, and two additional tracks are located outside and parallel to the building from front to rear. The yard tracks are laid in rock ballast and the yard is 190 ft. long from the street to the carhouse, providing ample space for switching and temporary storage.

Span construction is used throughout the yard except over the two outside tracks, where bracket suspension is employed. The outside track on the east side of the building borders a roadway convenient when handling

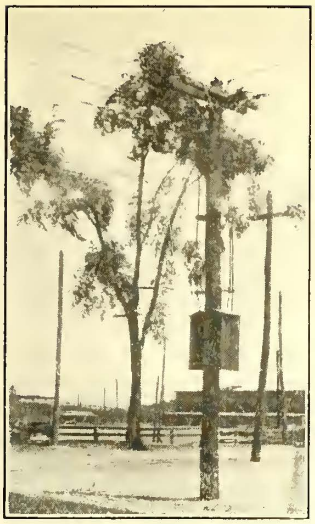


BAY STATE CARHOUSE—DETAILS OF PIT CONSTRUCTION

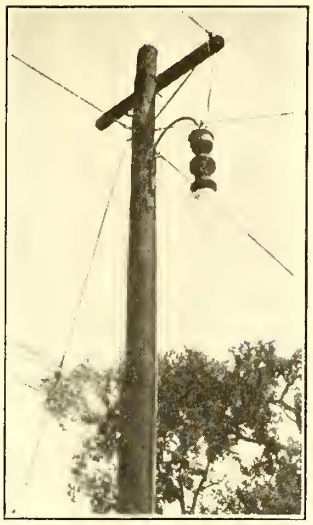
supplies by teams, and rapid deliveries can be made at any of the subdivided quarters above outlined, which are 20 ft. wide and extend from end to end of the carhouse. There is clearance of 5 ft. between the inside rail and the building wall to facilitate the loading and discharge of service cars on the side track. The yard is lighted by five inclosed arc lamps run in series off the trolley circuit. The lamps are suspended by iron hooks 16 ft. above the ground, and the last lamp of the circuit is grounded to the rail by a lead with drip loop, carried through a ¾-in. pipe to the rail. Both the yard lighting

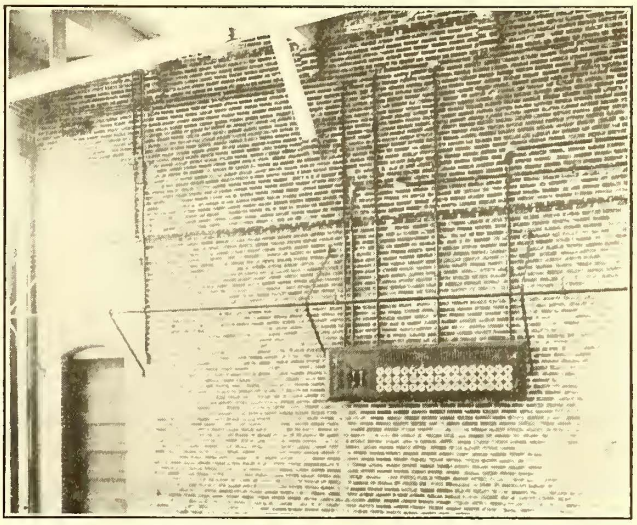


BAY STATE CARHOUSE—GENERAL VIEW SHOWING TOWER WAGON GARAGE AND SAND TOWER AT LEFT-HAND SIDE OF CARHOUSE



BAY STATE CARHOUSE—FEEDER SWITCH POLE BOX; GROUNDED ARC LAMP AT END OF YARD CIRCUIT





BAY STATE CARHOUSE—POWER AND LIGHTING CONDUIT AND WALL SPRINKLERS

and carhouse power supply are controlled by knife switches mounted in pole boxes outside the building.

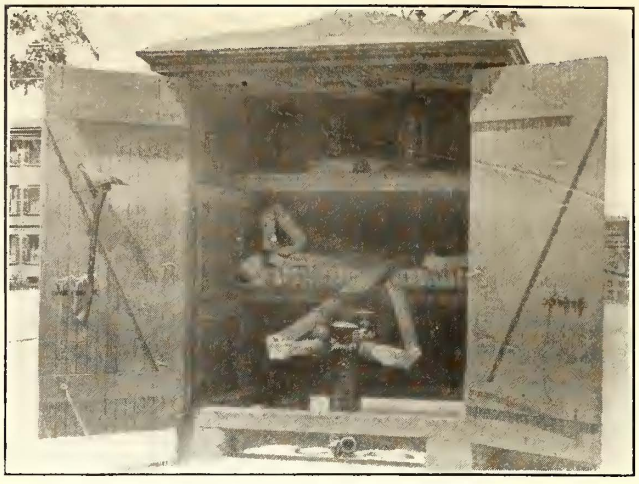
CARHOUSE AND SHOP EQUIPMENT

The building is equipped with Rockwood sprinklers throughout, there being 535 ceiling heads, 426 aisle heads and about fifty heads in the easterly section of the establishment. The dry-pipe system is installed, with four dry valves located in a compartment near the small repair shop. Air is supplied by a 6-hp. "National" motor-driven compressor mounted in one corner of the shop, and the water supply is taken from an 8-in. main leading from the power plant, where a fire pump supplements the city pressure.

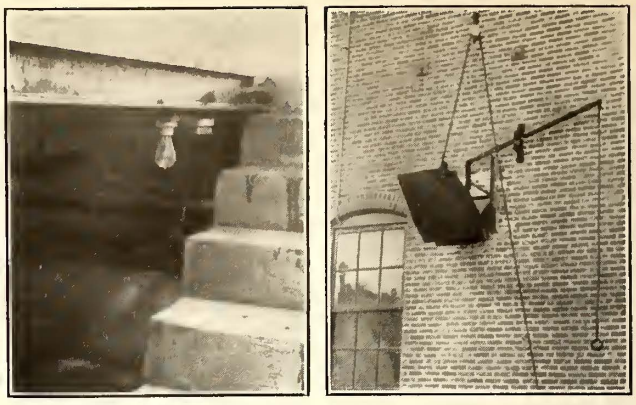
Aisle sprinkler heads in general are staggered and mounted 8 ft. apart longitudinally in each line, the adjacent lines being 30 in. apart and from 8 ft. 6 in. to 8 ft. 9 in. above the rail. Two air tanks, each 6 ft. long and 30 in. in diameter, are provided. Along the interior brick walls the sprinkler distributing pipes are carried by $\frac{3}{8}$-in. x $1\frac{3}{8}$-in. iron brace rods as illustrated, with a 25-in. clearance from the wall to the head. A 6-in. connection with the street main supplements the line to the power plant. Twenty-three wired-glass monitors are provided on the roof and each is equipped with two sprinkler heads, five being provided in a tower above the sand pit. A ventilator surmounts each monitor at one end of the latter.

Drainage arrangements are provided so that cars can be washed in any part of the carhouse. The interior illumination is provided by the monitors, supplemented by 56-watt incandescent lamps in the pits and along the walls. Near the entrance the main feed for both lighting and power service is carried through an inclosed fuse to a distributing board equipped with main lighting and power switches and forty-eight snap switches for local lighting circuits, each being provided with a 5-amp. inclosed fuse and mounted on a slate panel 7 ft. long and 18 in. wide. The snap switches are of the Hart indicating type and control the circuits lead-

BAY STATE CARHOUSE—INTERIOR VIEW, SHOWING SPRINKLER LOCATION



BAY STATE CARHOUSE—HYDRANT HOUSE IN YARD

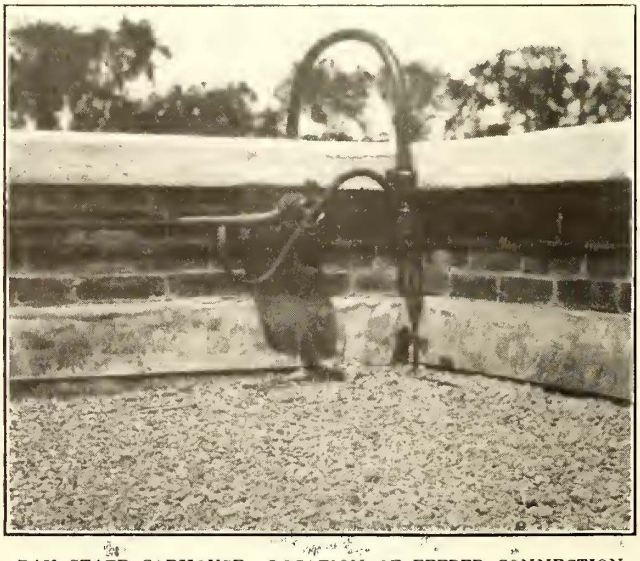


BAY STATE CARHOUSE—PIT LAMP; HINGED SAND SPOUT

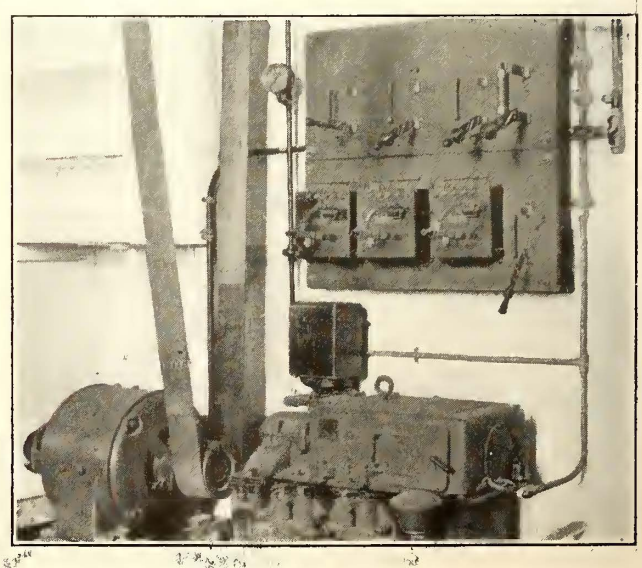
ing to the pits, offices, shop and other portions of the building. The panel is bolted to curved iron straps, which are in turn bolted into the wall and concealed behind the panel itself, the clearance being 7 in. between the panel and the wall. The bottom row of switches is 5 ft. 6 in. above the floor, in the interests of accessibility. A 23-watt lamp is installed over the track number at each door. In the pits 64-watt carbon incandescents are used, with four circuits for each pit, controlled by snap switches at either end. One lamp is mounted on the bottom of the rail behind each pier, the lamps in parallel rows being placed opposite one another and 3 ft. 6 in. above the floor. All interior wiring is in conduit, with the obvious exception of the trolley, which is carried under a trough at a height of from 16 ft. to 18 ft. above the rail. Five compressed-air outlets are provided in each pit. Wall lamps are mounted 14 ft. apart and 12 ft. above the floor.

Sand is discharged from the company's cars through the outer windows of a 20-ft. x 26-ft. sand compartment and thence elevated by a bucket conveyor driven by a 7½-hp. motor to a bin of 600 cu. yd. capacity. From here it is carried downward through ducts, either to a sand drier located directly below the bin or to two spouts, one of which discharges into a car within the building and the other outside. The spouts are each provided with a 12-in. x 24-in. opening controlled by a slide valve operated by hand lever, the spout being hinged and drawn out of the way by a rope when not in use. After passing through the drier, which is equipped with hot-water coils, the sand is ordinarily delivered to the motormen in buckets. The conveyor buckets are inclined and chain-driven, 12 in. long and 12 in. wide and from 1 in. to 5½ in. deep, tapering from front to rear. They are spaced 12 in. apart on centers and are easily inspected, either at the receiving room or through a hatchway at the top of the sand tower, which is illuminated by two 23-watt lamps. The coal bin of the heater room has a capacity of 50 tons, and a 5-hp. sump pump is provided to discharge accumulated water in the room into the sewer.

The repair shop contains a 24-in. Snyder drill, a grindstone and two emery wheels, group driven by a 7½-hp. motor. This motor, the air compressor, the conveyor motor and the pump motor are controlled from a small switchboard in the shop equipped with the usual knife and automatic release switches and rheostats, all motors being of the 600-volt, direct-current type. Tools are illuminated by two groups of five 23-watt lamps each, mounted in white-enameled reflectors about 9 ft. above the floor. The power panel is 36 in. x 39 in. in size and is carried by 1½-in. x ½-in. strap iron bolted into the wall. Two benches, two blacksmith's hand forges and a number of stock bins are also provided. At the front of the building a garage 21 ft. x 18 ft. in dimensions is provided for tower wagon equipment, with a panel carrying a positive and negative switch for battery charging in case an electrically propelled wagon is employed. These switches are separated by a wooden barrier 1 in. thick and 5½ in. deep, stud terminals being provided at the bottom of the panel for



BAY STATE CARHOUSE—LOCATION OF FEEDER CONNECTION ON ROOF



BAY STATE CARHOUSE—SHOP MOTOR, COMPRESSOR AND SWITCHBOARD

DETAILED COST OF MIDDLESEX STREET CARHOUSE—BAY STATE STREET RAILWAY

	Quantity		Unit Price	Total
Excavation	3,565	cu. yd.	$0.50	$1,782
Trenching	500	cu. yd.	.60	300
Fill	1,264	cu. yd.	.25	316
Concrete—plain foundation	908	cu. yd.	5.75	5,221
Concrete catch basins	3.6	cu. yd.	..	29
Concrete, 4-in. floor	40,998	sq. ft.	.12	4,920
Concrete, 4-in. sidewalk	56	sq. ft.	.18	10
Concrete coping, 13-in. wall	11	cu. yd.	12.00	132
Concrete steps	21	cu. ft.	.33	7
Concrete, reinforced coal bin	3.3	cu. yd.	10.00	33
Concrete sills	271	cu. ft.	.45	122
Concrete steps	23	cu. yd.	12.00	276
Concrete piers	10,295	cu. ft.	.30	3,088
Concrete, 6-in. floor	7,672	sq. ft.	.35	2,685
Tile coping, 13-in. wall	292	lin. ft.	.20	58
Brick chimney	4,000		16.00	64
Brick walls	671,000		15.00	10,065
Brick pilasters	19,000		16.00	304
Brick corbels	12,000		17.00	204
Timber—framing	53,000	bd. ft.	45.00	2,385
Timber—roof sheathing	79,000	bd. ft.	50.00	3,950
Timber—wall sheathing D & M	4,000	bd. ft.	55.00	220
Timber—shiplap	200	bd. ft.	50.00	10
Timber—miscellaneous	..		..	166
Roofing—tar and gravel	39,085	sq. ft.	..	2,900
Roofing—slate	550	sq. ft.	.10	55
Millwork—doors	582	sq. ft.	..	398
Millwork—windows	2,758	sq. ft.	..	1,863
Carhouse doors	1,495	sq. ft.	..	748
Skylights	2,352	sq. ft.	..	2,117
Cast iron	23,430	lb.	.03	703
Catch basins	6		7.50	45
Manhole—30-in. light weight	1		8.00	8
Manhole—29-in. heavy weight	1		10.00	10
Floor lights	22	sq. ft.	1.00	22
Steel—old rails	9,500	lb.	.02	190
Steel—stairways, etc.	7,149	lb.	.06	429
Steel—structural	1,569	lb.	.04	63
Drains	..		..	602
Heating	..		..	5,451
Electric lighting	..		..	2,601
Plumbing	..		..	1,039
Painting	9,819	sq. yd.	.18	1,767
Varnishing	561	sq. yd.	.25	140
Sprinklers	..		..	8,752
Fence—wood	..		..	1,095
Total				$67,345
Engineering, interest, insurance, contingencies, 11 per cent				7,408
Taxes and organization (during construction), 3.5 per cent				2,357
Grand total				$77,110

the attachment of charging leads, and each switch is in circuit with a 75-amp. inclosed fuse. The panel is of 1-in. slate, 16 in. x 18 in. in size, and is carried 6 in. from the wall.

The carhouse is equipped with three hydrant and hose houses located in the yard, and has nine stations equipped with Eco watchman's clock service. Each hose house is 6 ft. square and 6 ft. 6 in. high, containing one two-way hydrant and 225 ft. of hose in three lengths, with lantern, axe and wrenches. Each house is set on four concrete piers 12 in. square and 8 in. high, with a concrete base below. The houses are open under the roof and below the bottom, giving excellent air circulation.

CONSTRUCTION COSTS

The detailed cost of the carhouse, as compiled by the company's engineers, is shown in the accompanying table. The total given therein does not include the cost of three hydrant houses in the carhouse yard, which amounted to a total of $143 in addition.

The entire Pennsylvania Railroad System, whose 26,000 miles of track serve more than half the people of the United States, completed on Dec. 31 two years without one of the 361,572,114 passengers carried in that period being killed in a train accident. Figures for November and December were necessarily estimated. This record of two years means the safe operation of no less than 2,400,000 passenger trains, while at the same time approximately as many more freight trains were being cared for. A New Year's greeting to employees of the Pennsylvania Railroad from S. C. Long, general manager—posted on bulletin boards all over the railroad—congratulates them on the road's freedom from accident.

Power for Massachusetts Railways

Public Service Commission Gives Power Costs and Energy Consumption for Electric Railways

THE third annual report of the Public Service Commission of Massachusetts, covering the year ending June 30, 1915, contains the results of an investigation of the power plant conditions upon the various electric railways in the commonwealth, this having been considered necessary in connection with the investigation of proposed increases in the rates of fare. The information was requested from the various railway companies by circular letters, and the data which were developed from the replies appear in part in the accompanying table, the figures applying to the year ended June 30, 1914.

In all cases the figures are given for power measured as it leaves the power house or substation in direct-current form. The costs shown in the first column of the table include all power plant expense for fuel water, wages and maintenance, and the figures given in the second column show these generating costs plus 11 per cent on the power plant investment for interest and depreciation. In the third column the costs per kilowatt hour apply only to power that is purchased, and in this case no interest on plant investment is included, the cost being simply the rate paid to the company which supplies the power to the railway. In some cases the street railways which purchase all or a large portion of their power have idle stations which are kept in reserve, and although interest on the cost of these stations should properly be added to the amount paid for power, it was not possible to determine what this investment is in all cases, so that it has not been included in the figures of the third column.

TABLE SHOWING POWER COSTS IN CENTS PER KILOWATT HOUR ON MASSACHUSETTS ELECTRIC RAILWAYS

	Generating Cost per Kw.-hr.	Cost Plus 11 Per Cent Int. and Depr'n	Cost of Purchased Power	Kw.-hr. per Car-Mile	Total Car-Miles, Thousands
Bay State	0.77	1.36	....	3.40	30,612
Boston Elevated	.58	1.28	0.71	3.60	59,200
Worcester Consolidated	1.22	...	0.45	3.87	8,997
Springfield	.77	...	1.00	4.05	7,947
Berkshire	.89	1.71	0.55	3.92	3,726
Middlesex & Boston	1.41	...	0.75	2.85	3,756
Massachusetts Northeastern	....	...	1.40	3.54	2,545
Boston & Worcester	.99	1.80	...	3.82	2,122
Holyoke	1.03	1.56	...	3.39	2,134
Union	.84	1.32	1.20	2.74	2,788
Northern Massachusetts	2.85	3.65	1.80	3.15	877
Connecticut Valley	1.41	1.75	1.40	3.37	961
Milford & Uxbridge	1.62	2.34	1.20	3.57	765
New Bedford & Onset	1.67	2.52	2.00	2.86	520
Fitchburg & Leominster (water)	.58	.82	...	3.98	1,129
Fitchburg & Leominster (steam)	1.07	1.49	...		
Milford, Attleboro & Woonsocket	1.30	...	2.50	3.55	477
Northampton	.92	1.44	...	3.74	747
Interstate Consolidated	...	...	...	...	788
Brockton & Plymouth	1.08	2.43	2.00	2.59	456
Norfolk & Bristol	1.34	1.88	...	2.60	463
Norton & Taunton	1.97	2.90	...	2.12	368
Warren, Brookfield & Spencer	2.02	2.58	...	2.06	274
Blue Hill	1.36	2.34	2.82	2.45	375
Concord, Maynard & Hudson	1.75	2.78	...	2.79	286
Taunton & Pawtucket	2.38	3.26	...	2.66	251

In all cases the figures are given for power measured as it leaves the power house or substation in direct-current form. The costs shown in the first column of the table include all power plant expense for fuel water, wages and maintenance, and the figures given in the second column show these generating costs plus 11 per cent on the power plant investment for interest and depreciation. In the third column the costs per kilowatt hour apply only to power that is purchased, and in this case no interest on plant investment is included, the cost being simply the rate paid to the company which supplies the power to the railway. In some cases the street railways which purchase all or a large portion of their power have idle stations which are kept in reserve, and although interest on the cost of these stations should properly be added to the amount paid for power, it was not possible to determine what this investment is in all cases, so that it has not been included in the figures of the third column.

A considerable variation in the cost of coal at the power house is found on the various railways. For the first five companies in the list, the average cost of coal per ton of 2240 lb. is as follows: Bay State, $4; Boston Elevated, $3.56; Worcester Consolidated, $4.15; Springfield, $4.17; Berkshire, $3.76. The maximum price paid for coal by any one of the companies is $5.50 per long ton in the case of the Connecticut Valley Railway, the lowest price being that applying in the case of the Boston Elevated Railway, owing to the proximity of its generating stations to tidewater.

Manufacturers' Night at Boston

New England Street Railway Club Hears Address by Cornell S. Hawley on Relations Between Electric Railway Men and Manufacturers

NEARLY 400 members and guests of the New England Street Railway Club celebrated the first "Manufacturers' Night" in the history of the organization at the American House, Boston, on Jan. 25. The speaker of the evening was Cornell S. Hawley, president of the Laconia Car Company, Boston, and a past-president of the American Electric Railway Manufacturers' Association, his subject being the "Relation Between Electric Railway Men and the Manufacturers." At the close of the address, extracts from which are given below, an entertainment program consisting of a strenuous amateur minstrel show staged by club members was enjoyed by all present.

Mr. Hawley spoke in part as follows:

"The electric railways are operating, in many cases, under exacting regulations and facing serious wage demands. They cannot without permission from some commission or organization increase fares or reduce service or wages. It is, however, to be hoped that future railway laws in all States will be those well designated as the 'wisest laws,' laws that will 'lay down general principles and standards and give to the administrative body ample discretionary executive powers.'

"We all realize that any efforts by the manufacturers to create a better feeling on the part of the public towards the railways are helpful not only to the railways but to the manufacturers themselves. The prosperity of the manufacturers is dependent upon that of the railway companies.

"Probably in no line of business are the relations between the purchasers and the manufacturers more cordial than in the electric railway field. The railway man assists the manufacturer in pointing out to him new fields for his devices or inventions and improvements which can be made in his present apparatus. And the manufacturer is equally ready and willing to show the railway man where economies or improvements can be made in the railway equipment or construction. This mutual interest inspired the organization of the present Manufacturers' Association, which was formed at the Saratoga convention in 1903. Its purpose, as stated in the by-laws, was not alone the advancement of the interest of its members, but also the advancement of the interests of the Railway Association and its affiliated bodies. The membership roll of the Manufacturers' Association has increased very rapidly, the scope of its work broadened, and I believe it has fully met the expectations of its organizers. The Railway and the Manufacturers' associations have worked in the utmost harmony. It was, however, at the recent convention suggested by the retiring president of the American Electric Railway Association that a still closer relationship would be advisable, and the executive committee of the Railway Association, acting upon this suggestion, has recommended a change in its by-laws to provide for an affiliated association consisting either of the present association or a new one.

"If such a closer relationship can be established and the manufacturers retain their organization and perform the same functions as at present, this will undoubtedly meet with the hearty approval of the manufacturers. Some fears, however, have been expressed that the closer relationship suggested may mean the practical absorption of the Manufacturers' Association.

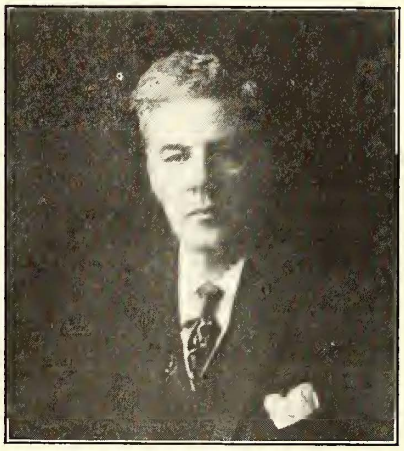
"We have recently read with great pleasure that 'the swing of the pendulum is toward constructive policies. For the first time in some years the annual message of the President is not punctuated with sharp shafts aimed at the railways, the industries, the corporations, the banks and the possessors and creators of wealth.' 'The people now realize their delusions. They discovered that when big business was crippled, little business suffered; that when the initiative was taken from industry, not only the capital invested suffered, but that every workman suffered with his employer.'

"And what James J. Hill, that great railroad builder, has said concerning the steam railroads, applies also to the electric railways. That is, 'The railroad is the sap of the industrial tree. It is the speed indicator of industry. It is the thermometer of credit. Its stability, its prosperity, its ability to confront with confidence a totally new era in the capitalistic and credit conditions of the world, must be protected and assured. No duty devolving upon those who sit in the watch-tower of the world can take precedence of this."

John A. Hill Dies

Had Done a Great Deal to Advance the Interests of Technical Journalism

JOHN A. HILL, president of the Hill Publishing Company of New York, died suddenly from heart disease on Jan. 24 while traveling to his office from his residence in New Jersey. His company publishes *Engineering and Mining Journal, Engineering News, Power, Coal Age* and *American Machinist.*



JOHN A. HILL

Mr. Hill was born in Vermont, and at the time of his death was fifty-seven years old. His early life was spent in Central Wisconsin, and at fourteen years of age he entered a rural printing office.

After putting in a few years gaining practical experience there he purchased a half interest in a machine shop, but, in 1878, he moved to Colorado. Here, for a time, he operated a locomotive on the Denver & Rio Grande Railroad, but his bent toward journalism induced him to found in 1885 the *Daily Press* at Pueblo, Col., of which he was editor for several years, and to write articles on locomotive and machine shop engineering for the technical press. A number of his technical articles written during this time were published in *Locomotive Engineering* of New York and led to an invitation to him in 1888 to take charge of the paper. Seeing its possibilities, Mr. Hill associated himself with Angus Sinclair and purchased the publication, whose subscription list grew rapidly. After eight years with *Locomotive Engineering* Mr. Hill, in 1896, sold his interest in that paper to Mr. Sinclair and purchased the *American Machinist.* Later, *Power, Engineering and Mining Journal,* and *Engineering News* were purchased. *Coal Age* was established in 1911.

To house these different publications the Hill Building was erected at Thirty-sixth Street and Tenth Avenue, New York. It is thirteen stories in height and occupied largely by the several publications of the Hill Publishing Company and by the printing plant operated in connection with them. Many special devices for expediting the work and safeguarding the employees are installed in this building.

Construction and Operating Details of Philadelphia Electrification*

The Author Describes the Service Supplied by the Suburban Electrification, Explaining the Reasons for Choice of the A.C. System and Outlining the Methods Used in the Design and Construction of the Overhead Wiring

By GEORGE GIBBS
Gibbs & Hill, Consulting Engineers, New York City

THE recently-inaugurated electric train service between Philadelphia and Paoli on the Pennsylvania Railroad is wholly suburban, neither through passenger nor freight service having been electrified. To provide for these latter services electric locomotives would have been required, together with the establishment of outlying yards and extensive engine terminals for the interchange of power, and these would have introduced complicated problems in the way of rearrangement of engine runs, special freight switching and the delay to passenger service incident to the additional power interchange. Also, electric operation for through trains would not have assisted in the solution of the problem of congestion at Broad Street Station, the primary reason for the installation, and it was not, therefore, considered in connection with the recent electrification.

The electrified suburban service includes all of the Philadelphia-Paoli locals and expresses, consisting of seventy-eight trains a day operated regularly at half-hourly intervals with additional trains in the morning and evening rush hours. The half-hourly trains make all stops, while the extra rush-hour trains, five each way per day, omit stops for about one-fourth of the run in the outskirts of Philadelphia. There are nineteen intermediate stations on the line, making the average distance about 1 mile between stations. The running time, under steam conditions, was fifty minutes for east-bound local trains and fifty-seven minutes for west-bound local trains, owing to the 0.7 per cent average grade existing for the first 10 miles of route outside of Philadelphia. Under electric operation, the equipment was laid out to operate on a forty-seven-minute east-bound schedule and a fifty-minute west-bound schedule.

At present, as initial operation, the runs are made in forty-nine minutes and fifty-two minutes respectively, this being equivalent to an average speed, including stops, of practically 25 m.p.h. The maximum power required during acceleration is about 850 hp. per car, and for the present electric schedule the demand for power during short-time peaks is about 20,000 kw., and the average hourly demand during the rush-hour is about 6000 kw. The average load for the day is only about 2000 kw.

To meet the schedule requirements two of the most powerful electric motors which could be placed upon one truck without raising the car floor or weakening the underframe were installed, these being of 225 hp. with forced ventilation, and, to make the schedule independent of the number of the cars in the train, all cars were equipped with motors.

Choice of Electric System

The choice of electric system for the Philadelphia installation was made after a careful analysis of all systems available, not only for the present work and its probable extension in and around Philadelphia, but for possible future application of electric traction to long-distance hauls on the main line of the railroad. Because of the fact that the railroad company had an important and successful third-rail direct-current electric installation at its New York terminal, it was naturally predisposed to adopt the same system in Philadelphia, provided that this was found suitable for long-distance extension in the future for all kinds of traffic. However, the character of the New York installation was fixed by local conditions in an underground terminal and by the state of the art at the time it was decided on, nearly ten years ago. Therefore, the presence of this system, while it was, of course, considered, was not allowed to handicap future extensions there and elsewhere, especially because a new and better system had been since developed and could be made to operate harmoniously with the existing system.

It was concluded that an overhead contact wire, conveying high-tension alternating current, was the most suitable system for long-distance traction with heavy and relatively infrequent train units, and presented also the fewest objectionable features for the equipment of large and complicated yards. In addition, an extremely simple and efficient appliance, the mercury-arc rectifier, had fortunately been developed, so that it had become possible to operate direct-current or alternating-current motors interchangeably on either an alternating-current line or a direct-current line. This development was the last step needed to unify the operations of the two prominent electric systems, and the company was thus enabled to adopt the alternating-current system in Philadelphia with the assurance that if Philadelphia and New York were electrically connected in the future, the two systems would work together to make a complete operating division.

Catenary Construction

The overhead contact wire from which the high-tension alternating current is collected has been designed, in this installation, to be supported on a catenary system without any provision for changes in height due to temperature variations. In foreign installations the contact line has been frequently divided into sections a half mile long with the wire anchored at the middle of each section, and the two ends provided with tension weights running over pulleys. But complications are introduced in carrying out consistently any automatic tension scheme, and the writer believes that, for the present at least, it is inadvisable to complicate overhead structures with such devices in advance of positive knowledge that they will be needed.

On the Philadelphia electrification the result of not using automatic tension has been that there is a maximum vertical movement of trolley wire of about 12 in. on tangents for each 100 deg. of temperature range, and on curves this movement may be as much as 30 in. with a 20-in. horizontal movement.

Throughout the installation insulation of the very

*Abstract of a paper presented before the Philadelphia branch of the American Society of Civil Engineers, Jan. 3, 1916.

best kind has been used. On portions of the line subject to frequent hard usage, at least double insulation has been provided, and on sections of the line subjected to the most uncertainty or abuse triple insulation to ground has been installed. The material for the insulators also was made the subject of a very careful study. The writer was much impressed with the beautiful appearance of foreign-made porcelain insulators, especially the German, and obtained representative samples for tests. Upon investigation, however, it did not appear that these were entirely desirable for American conditions, chiefly because of their excessive brittleness. It was finally decided to adopt American porcelain insulators made by the wet process, special care being taken to produce mixtures which would withstand sudden changes in temperature. In general the problem of obtaining perfect insulators seems to reside chiefly in getting a proper mixture free from impurities, and in molding it without voids and firing it at the proper temperature. If the insulator is over-fired it will be very brittle, and if under-fired it will be too porous, so that moisture will be absorbed and will cause an electrical failure.

Suspension-type catenary insulators were used for all of the overhead construction. These consist of three porcelain disks in series, each 8 in. in diameter and cemented into a malleable iron cap. The porcelain and the metal part are put together at a temperature of 120 deg. Fahr., so that in cooling they will not produce bursting strains on the porcelain by differential contraction. Electrical tests were made both wet and dry, and under the worst conditions these were required to show in the completed unit a factor of safety of ten in the wet tests and of twenty in the dry tests. Mechanically, the breaking strength of these insulators is about 18,000 lbs., while the maximum working load is 5500 lb.

Construction Methods

In connection with the erection of the overhead construction the first important operations were in the designing offices, where the plans for all structures were made in detail. It was especially important to avoid, as far as possible, all cutting and fitting of wires, hangers, etc., in the field, and in consequence, elaborate and complete plans were made in the designing office to determine the position which the trolley wires would assume at each point over the line with certain predetermined sags, the location of messengers in reference to the tracks, etc. The calculations established the length of all trolley wire hangers which were furnished from the plant to the field cut to length and fitted with their attachments. When put into position it was found that the trolley hung in its proper plane and position with but little field adjustment. While this process involved a large amount of designing, it was considered that it was amply justified by the resulting saving in cost and time during the construction period.

Excavation for about 412 bridge foundations was required for the catenary supports, and the soil for the most part was of clay which was stiff enough to require no shoring when the excavation was followed closely by the concreting. The aggregates for foundation concrete were distributed by a work train in approximately the required quantity adjacent to each foundation, and all concrete was hand-mixed on boards and was poured very wet, so that it was not necessary to do a great deal of tamping. As far as practicable, excavations for the ground ends of the anchors were made at the same time as those for the pole foundations, and the concrete slabs at the bottom of the anchors were poured at the same time as the main foundation.

In the erection of bridge structures the poles were unloaded near their respective locations and then lifted into place on their foundations by a derrick car. The anchor and signal bridges were erected in position by a derrick car directly from the freight cars on which they were received. Following this, the cross-catenary spans, consisting of top and bottom wires with their connecting links, all previously fitted together at the construction yards, were hung in place from work trains, and the whole catenary pole span was then completed by putting on the guy rods and making final adjustments for tension.

Erection of Longitudinal Wires

When enough structures and bridges were in place and the insulators suspended from them, wire-stringing work trains were organized. These were usually made up of one or two flat cars to carry the reels of wire, one or two tower cars and a box car used as a material and tool car. The steel messenger wire was fed out from the top of the tower car and strung from anchor bridge to anchor bridge and adjusted to the proper unloaded tensions, which were furnished by the office force. Until final adjustments were made this messenger wire was supported on pulley blocks suspended from the insulators, thus allowing it free play longitudinally. These blocks were removed later and regular supporting castings were substituted.

While supporting its own weight only, the cable was given such a tension as would be necessary to insure proper sag when fully loaded. This tension was computed and furnished to the field forces by means of curves showing the relation between temperature and tension for each stretch between anchor bridges. The proper tension was obtained by means of a dynamometer, and the cable was allowed to stand for a time and adjust itself approximately to uniform tension throughout its length, and then was finally socketed and anchored at both ends.

Following the erection of the messenger wire, a train made up of several tower cars marked the proper location of the hangers on the messenger in accordance with the drawings, and then fastened in position the hangers which had previously been cut to length and fitted with castings. The next operation was to string the auxiliary and main trolley wires from anchor bridge to anchor bridge, holding the wires temporarily at the bottom of the hangers by means of iron straps which could readily and quickly be applied.

The final operation, which was carried out by a train of tower cars, was to adjust the trolleys to their proper tension and to clip them in. Where cross-overs, section breaks, etc., occurred, the fittings were put in as a last operation, because only one or two tower cars were required to accommodate the number of workmen that could be employed to advantage in the short lengths involved.

For all of this overhead construction, ten flat cars were equipped with towers, the working platforms of which could be readily raised and lowered by means of chain blocks. When in the lowest position these towers had a height of 18 ft. 6 in. above the rail, with a possible raise of 4 ft. The number of men employed in the construction work varied from 200 to 685, and were variously divided into gangs at different stages of the work, consisting of laborers on excavation and concrete, iron workers on the erection of structures, linemen for stringing the wires, bonding gangs on track bonding, carpenters on form work, and miscellaneous workmen and wiremen on the equipment of substations.

Foundations for catenary bridges were completed at the average rate of about two per day, reaching a maximum of six per day. With the derrick car twenty-five

poles could be picked up and set in place per day, the tubular bridges being erected and completed at the rate of two per day. The erection of longitudinal wiring, including messenger and trolleys, clipping in and adjusting, etc., was completed at the rate of 3.1 track-miles per day for straightaway work. The wire train, stringing four wires at once, could run out 8 miles per day, but in complicated yard work the progress, of course, was much slower. The equipment of one train at work for about twenty-six weeks was required to string and clip in the trolleys and to make the section breaks, cross-overs, etc., complete. Track bonds were applied at the rate of about 250 bonds per day.

New Franchise Adopted in Des Moines

Digest Covers Main Points of Rehabilitation, Safety and Service Regulations, Supervisors, Arbitration, and Fares and Transfers

THE Des Moines (Iowa) City Railway, after ten years of franchise controversy and negotiations, recently secured what is considered by its owners to be a workable franchise, as noted in the ELECTRIC RAILWAY JOURNAL of Dec. 4, page 1137. In view of the extended negotiations carried on before reaching the final results, the general publicity given to the case and the importance of the company, it is felt that a résumé of the main provisions of the franchise may now be of interest to electric railway operators.

PROVISIONS FOR REHABILITATION AND NEW CONSTRUCTION

The franchise extends for twenty-five years from the date of the final acceptance by the company after the approval by the electors. Within three years after the passage of the ordinance the company is required to follow a program of reconstruction, rehabilitation and new construction involving an expenditure of $1,500,000. Within this time it must remove from the streets all its present unused track, make certain specified extensions, reconstruct at least 20 miles of the existing tracks with new rails of the most modern and improved type, increase its present power plant by adding the necessary equipment for efficient and continuous operation, place in service within nine months after the approval of the ordinance at least twenty-five new double-truck cars of up-to-date design (said cars to be equipped with four motors and with both hand and power brakes), and make certain property transfers with the Inter-Urban Railway.

The franchise contains various detailed specifications in regard to the construction and spacing of tracks, rails, bonding, special work, poles and wires, feeder and transmission wires, conduits and conductors. In the matter of extensions, it is provided that a majority of the adult residents of any district may, in writing, petition the City Council for an extension, and this body may order the extension made, provided the territory contain a sufficient population for the company to receive a revenue equal to the cost of operating the cars (including ordinary track, car and overhead maintenance expenses), together with a reasonable depreciation upon the cost of the extension and the equipment used.

SAFETY AND SERVICE REGULATIONS

The company is required to operate on all its lines cars of modern design and equipment, and all its new cars must be equal in efficiency to the type previously described, and be furnished with such improvements and appliances as are deemed by the supervisors necessary and proper for the safety, convenience and comfort of the passengers, the employees and the public. It is the intent of the ordinance that the construction, machinery and equipment as a whole be kept abreast of the progress of invention and be at all times equal in quality to that in use on the best managed and equipped street railways in cities of the same size and class.

It is expressly agreed in the ordinance that no dividends on the outstanding stock are to be considered or allowed in determining the quality or quantity of service the company is obligated to furnish. Subject to the payment of all costs of operation, including taxes and interest at not to exceed 5 per cent on the company's bonded indebtedness and not to exceed 6 per cent on its other indebtedness, and also subject to the setting aside of a depreciation fund after the three-year period, the city is entitled to have and the company is bound to render first-class service.

Unless otherwise provided by statute the company, except for snow and ice, is not required to sweep, clean or sprinkle any street save in places where by reason of sand or other causes it is itself responsible for the condition. Even snow and ice need not be removed from unpaved streets or from paved streets in the outlying districts, unless in the judgment of the City Council the snow and ice removed from the tracks to the other portion of the street constitute a serious impediment to public traffic. The company is responsible for the improvement and maintenance of streets and pavement between its tracks and 1 ft. outside, and on bridges for the space of 3½ ft. each way from the center line between the rails.

The company is allowed to use either overhead or underground trolley construction and any motive power except steam locomotives, but any power other than electricity may be utilized only with the consent of the city. In the case of electric motive power, each motor passenger car must be in the control of a motorman and a conductor who have had at least ten days' instruction under an experienced motorman or conductor in service for at least one year immediately prior to such instruction.

APPOINTMENT OF SUPERVISORS

The ordinance provides that two supervisors shall be chosen to have control over the quantity and the quality of service, schedules, routes and terminals, the character and equipment of cars, and the stopping points for cars. One supervisor, representing the city and holding office at the pleasure of the City Council, is supposed to act as a technical adviser to this body in all matters affecting the interpretation or application of the ordinance. The other supervisor is to act in behalf of the company and represent it in all transactions with the city arising out of operation under the ordinance. The company may at any time, upon notice to the city, have the duties of the company supervisor performed by a designated executive office to the same effect as if the former were acting. The company must furnish the city supervisor with a furnished room and necessary clerical help, the latter now to cost not to exceed $100 per month. This allowance, however, is to be increased hereafter in the same ratio as the gross receipts of the company increase. The salary of the city supervisor must be paid by the company at the rate of one-fourth of 1 per cent of the gross annual earnings, but not to exceed $5,000 per annum. The company must furnish the city supervisor monthly reports of car mileage, earnings and expenses of operation, investments in renewals, betterments and additions, and such other reports as are requested by him or the City Council, and must give him free access to inspect and audit the books.

The ordinance provides for arbitration of questions upon which the supervisors fail to reach an agreement,

and of differences between the company and its employees in matters not excluded from arbitration or covered by some other method of settlement under law or contract. Each of the parties must appoint one arbitrator within five days after written notice. If the two arbitrators fail to decide within fifteen days after the notice for the appointment of the arbitrators is given, or such additional time not exceeding thirty days as the arbitrators unanimously agree upon, the parties must within five days after notice thereof appoint a third arbitrator. In the case of failure to do so, the two arbitrators already appointed are to select the third one. In case this is impossible the Supreme Court of Iowa is to appoint the third arbitrator. Moreover, in case either party fails to appoint its arbitrator at first, this court, upon the application of the party not in default, may appoint the arbitrator for the other one.

Rates of Fare and Transfers

The maximum rate of fare for a single continuous ride within the limits of the city in one direction is fixed at 5 cents, but the company in at least twenty-five convenient places must sell to any person applying therefore six tickets for 25 cents, each as good as a 5-cent fare. The fare for children under twelve years of age is 2.5 cents, the payment of a 5-cent cash fare entitling a child to a ticket which will be accepted as fare for another ride. Children under six years of age, when accompanied by an adult paying fare, may ride free. High school pupils on their way to and from school on actual school days, between 7.30 a. m. and 4.30 p. m. are to be carried on non-transferable tickets sold in books at the rate of twenty for 50 cents. These tickets must be kept on sale in all high schools by persons furnished without charge by the principals thereof. The charge for owl service may be double the maximum rate.

Transfers must be issued for lines that cross or come within what the supervisors consider a reasonable distance of the line on which the rider first took passage, but the payment of a single fare will not entitle the passenger to reverse his general direction of travel. Transfers will be issued upon transfers without additional charge, under reasonable regulations for the prevention of fraud. The use of a transfer by other than the one to whom originally issued is a misdemeanor, punishable by a fine not to exceed $25.

Miscellaneous Requirements

The ordinance contains other clauses relating to the use of the company's tracks for interurban and freight traffic, the necessity of city approval in locating new lines and abandoning old ones, and the joint use of poles by the city without compensation. It also provides that the company must advise the city of the terms of all security sales, and that the proceeds must be used for refunding purposes or for additions, betterments and improvements.

After the expiration of the three-year rehabilitation period the company is required to set up a sufficient depreciation fund to cover "replacement, renewals, new equipment and installations necessary to maintain the entire system and preserve the property of the company, including power plants, overhead car lines, transmission lines, feeder lines, track and car equipment in an efficient operating condition and in modern first-class condition suitable for carrying on the company's business."

The company agrees to give the city the right, during the term of the franchise, upon at least six months' previous notice in writing, to purchase the entire street railway system. For this purpose it was agreed that the value of the property, as of Aug. 1, 1915, was $5,000,000. Provision is also made that a default in observing the ordinance for three months (unless due to strikes, court action or other unavoidable causes) constitutes a forfeiture of the grant. The company must remain an Iowa corporation, with principal office in Des Moines.

The company may pay salaries according to those of enterprises of similar magnitude and general character for like services, but the city by written notice may object to any specified salaries, and in the event of a disagreement, the determination of a proper amount must be submitted to arbitration.

High-Pressure Steam Station in Illinois

A Steam Pressure of 350 Lb. Will Be Generated in 10,000 Sq. Ft. Boilers

WORK has been started on the new power station of the Public Service Company of Northern Illinois on the Desplaines River 1 mile south of Joliet, Ill. This installation will embody the latest ideas in high-pressure steam generation. The three Babcock & Wilcox boilers to be installed will be of the cross-drum type with a heating surface of 10,000 sq. ft. and will produce steam at 350 lb. pressure with 225 deg. Fahr. superheat. Superimposed on each boiler there will be a Babcock & Wilcox all-steel economizer with 6700 sq. ft. of heating surface. Each boiler with its economizer will comprise a complete unit which will be incased in a steel shell to prevent air leakage. Two of these units will supply enough steam to operate one 12,000-kva. turbo-generator. The third boiler will be held in reserve.

Two Babcock & Wilcox chain-grate stokers placed side by side in a single furnace will serve each boiler. The stokers will each measure 8 ft. wide x 14.5 ft. long, giving a grate area of 232 sq. ft. per boiler. The ratio of grate area to heating surface will be 1 to 42.5. This is one of the highest ratios used by any power house in the Middle West. Induced draft will be supplied by motor-driven blowers. An individual self-supporting steel stack will be installed for each boiler. The only steam-driven auxiliaries in the plant will be the boiler-feed pumps, which are to be of the multi-stage, turbine-driven type. A bucket elevator will be used to convey the coal from the cars to overhead bunkers, and the ashes will be handled entirely by conveyors from the furnace until deposited in outgoing gondola cars. The fuel used will be screenings from the Illinois mines.

For the present one turbine of the Curtis horizontal type with an exciter on the same shaft will be installed. It will be rated at 12,500 kva. or 10,000 kw. at 80 per cent power factor, and will produce energy at 12,000 volts, three-phase, 60 cycles. The turbine is designed for a working pressure of 300 lb. In the steel and masonry building which will be erected space will be provided for a future unit which will probably have a rating of 20,000 kw.

The Westinghouse surface condenser into which the turbine will exhaust will contain 20,000 sq. ft. of cooling surface and will be designed for a back pressure of 0.77 in. absolute. With the turbine operating at full load the condenser will take 18,000 gal. of circulating water a minute. The condenser auxiliaries, including the Leblanc air pump, are all to be motor-driven.

The station is being designed by Sargent & Lundy, consulting engineers, Chicago, assisted by Von Holst & Fyfe, architects. It will be operated by the Public Service Company of Northern Illinois, of which Samuel Insull is president, F. J. Baker is vice-president in charge of operation and construction, G. H. Lukes general superintendent, and J. L. Hecht mechanical engineer.

Illinois Association Meets

The Principal Paper Presented Was on Expanded Steel Truss Poles, Whose Method of Manufacture and Performance in Service Were Described—There Was Also a Discussion on the Safety Code, and Officers for the Ensuing Year Were Elected

SIXTY members of the Illinois Electric Railways Association attended the annual meeting in Chicago on Jan. 21. New officers were elected, and a stereopticon lecture on steel poles was delivered by A. J. Bates of the Bates Expanded Steel Truss Company, Chicago. The present status of the proposed safety code rules of the Bureau of Standards, Department of Commerce, was detailed by John Leisenring, chairman of the engineering committee of the Illinois association.

L. C. Haynes, East St. Louis & Suburban Railway, called the meeting to order, as President F. E. Fisher was delayed by floods in the Illinois River valley.

Proposed Safety Code Rules

Mr. Leisenring, Illinois Traction System, spoke of the need for close attention on the part of all railway members to the proposed safety code of rules. The president of the association had sent out a request for a written discussion of the rules, but the lack of answers indicated that the importance of the rules had not been realized. The rules were prepared by the Bureau of Standards about two years ago. Since that time the bureau has held numerous open meetings, and a large number of changes in the rules have been made as a result of work of the committees of the American Electric Railway Association and other associations. The present code, he said, was much less radical than that originally proposed, but there were still some points that needed revision. It is understood that after the rules have been finally approved and sent to the State commissions the bureau will recommend their adoption for a trial period of one year. Then the necessary revisions will be made, and the rules will finally be adopted for all properties. Much weight should be attached to these rules, because they will be promulgated by a government body.

Mr. Leisenring said that probably a final meeting would be held at Washington during the next two or three months to secure the ratification of the code as it now stands. A letter from S. W. Stratton, director of the Bureau of Standards, was read. This letter outlined the course of procedure which would be followed in obtaining final ratification of the code.

The chair, at the request of Mr. Leisenring, called upon E. J. Blair, Chicago Elevated Railways, to say a word regarding the proposed safety code rules. Mr. Blair said it was his desire to try out all of the rules that applied to his property and thus learn by actual experience which rules might be objectionable. After the trial he would be able to turn in valid objections, not objections to little things like the installation of rubber mats and minor safety improvements that would total but a few hundred dollars. Mr. Blair recited the work which has been done by the American Electric Railway Association toward the revision of this code, and he recommended that the Illinois Association instruct its engineering committee to study the code during the coming year so that it might prepare a strong discussion of the code later on.

Mr. Leisenring then described the year's work as planned for the engineering committee of the Illinois Association. He said that the studies had been confined to the subject of power economy, subdivided into three parts: (1) Distribution; (2) on the car; (3) return circuit. Papers had been read at previous meetings of the association on the subject of oxy-acetylene welding and on the proper location of feeder taps. These were part of Subjects 1 and 3. The paper of the day on the subject of steel poles was a part of Subject 1. Later a paper would be presented on the power economies to be obtained on the car. Mr. Leisenring then introduced A. J. Bates as the inventor and manufacturer of "a remarkable new expanded steel truss pole which was meeting with success in the electric railway electric lighting and telephone fields."

The Expanded Steel Truss Pole

Mr. Bates described and illustrated with the help of a lantern, the development and the commercial manufacture of his light-weight one-piece steel truss pole intended for general use on electric railways as a substitute for heavier steel poles and wooden poles.

An article describing this type of pole appeared on page 370 of the issue of this paper for Aug. 28, 1915.

The author said that the truss type of structure was fundamentally correct for poles because its design was such as to obtain maximum strength in proportion to weight, and that this strength could be applied in the direction in which it was needed. Fabricated poles were too costly to compete with wood except under special conditions, but a very light-weight expanded steel truss with the strength across the line and flexibility along the line made possible the use of steel poles in direct competition with wood. By means of his process of shearing an I-beam longitudinally and expanding it into a pole, he obtained a truss structure from one piece of steel and eliminated all excess material such as that required for lapping and riveting in a fabricated pole. He presented a comparison of a latticed pole 22 ft. long which he said, due to punching for riveting. had had its effective strength reduced by ½ in. of its width and also contained 107 lb. of useless material. There were fifty-one pieces of steel to be assembled at a high cost for labor, and the total weight was 377 lb.

The Bates pole made of one piece of the same length and strength weighed but 270 lb., contained no excess metal, had no joints, was easy to paint and had been manufactured at a comparatively low labor cost. The surface of all the material in this type of pole was exposed so that it could readily be painted. There were no closed air pockets, as in a tubular pole, to accelerate the formation of moisture and hasten rusting in inaccessible places. By reason of the design of this pole, as compared with the tubular steel pole, it is possible on account of the ease of manufacture and the full utilization of the metal to sell two expanded poles for the price of one tubular pole.

The author pointed out that the time to calculate the strength of a pole was not when it was first installed but after five or six years of life. He then showed a picture of an Archbold-Brady 72-ft. A-frame flexible transmission line structure that had been twisted under test. He said that many miles of transmission line had been built of these structures and that they were very satisfactory in service. He called attention to the fact that while these structures had comparatively low strength along the line, they were exceptionally strong

across the line. Mr. Bates pointed out that this was a design of structure which, if followed for transmission service, would give excellent results. He believed that designers in the past had called for too great strength along the line, even going so far as to demand an intermediate structure, which in case of broken wires would serve as a dead-end structure.

The speaker then showed with lantern slides how the poles were made in his company's steel plant at East Chicago, Ind. Specially rolled I-beams are passed under a rotary shear 30 ft. in diameter which cuts the web of the beam and provides for the expansion which is done later. This shear has a capacity of one pole every half minute. After the shearing process the beams are charged into a furnace and then taken to an expanding machine which grips the two flanges and pulls them apart forming a truss from the sheared parts of the web. The beam is now a pole, and it is passed onto a cooling and straightening bed and later, at a temperature of 200 deg., is dipped into hot paint. This painting process with steam coils in the paint tank serves to coat the steel in an exceptionally thorough manner, because the hot liquid is so thin that it gets under the scale and penetrates any oxide that may be covering the metal.

The capacity of the manufacturing plant is now 450 poles a day. Slides were displayed showing the line of special malleable-iron fittings which had been designed to provide for a convenient attachment of cross-arms, span wires, etc. Other slides showed poles erected along the lines of several steam and electric railways. One installation made by the Aurora, Elgin & Chicago Railroad at St. Charles had 30-ft. poles on one side of the street and 35-ft. poles on the opposite side. The pairs carried the span wires and the longer poles carried cross-arms supporting the wires of the Chicago Telephone Company. One view showed an installation of a 300-ft. high-tension line span carried on 60-ft. poles. These 60-ft. poles had been made by combining two 35-ft. poles for the base and adding a 25-ft. pole for the top, the three poles being riveted together. The total cost for the 60-ft. pole was about $1 a foot.

Mr. Bates also described the design, manufacture and use of expanded steel trusses for fence posts, car sills, car-truck side frames and for use in the Bates reinforced concrete tie. He said that the tie consumption by the American railways was more than 750 ties a minute. A very strong, durable tie is obtained by the use of a pair of Bates expanded steel trusses as reinforcement and concrete made extremely dense by mounting the molds on a jigger. Thus the compressive strength is increased from 1600 lb. to 3200 lb. per square inch.

Election of Officers

After the transaction of usual business the following officers were elected to serve during the coming year:

President, J. R. Blackhall, general manager Chicago & Joliet Electric Railway.

Vice-president, C. F. Handshy, assistant general manager Illinois Traction System, Springfield, Ill.

Second vice-president, D. E. Parsons, general manager East St. Louis & Suburban Railway.

Executive committee: F. E. Fisher, general superintendent Chicago, Ottawa & Peoria Railway, Joliet, Ill.; B. I. Budd, president Chicago Elevated Railways; H. E. Chubbuck, vice-president executive Illinois Traction System, Peoria, Ill.; Joseph F. Porter, president Tri-City Railway & Light Company, Davenport, Iowa; E. C. Faber, general manager Aurora, Elgin & Chicago Railroad, Aurora, Ill.; Frank J. Baker, Middle West Utilities Company, Chicago, Ill.

At the close of the meeting John Benham, International Register Company, Chicago, announced the summer boat trip meeting of the Central Electric Railway Association, which has chartered a large passenger steamer for a tour from Toledo up the Great Lakes to the Soo and down to Benton Harbor and Chicago.

Wood Preservers' Association Proceedings

Chicago Convention Disapproves of the Proposed Specifications for Wood-Block Paving and Preservatives

At the Chicago convention of the American Wood Preservers' Association, referred to in last week's issue when abstracts were published of the papers interesting to electric railways, discussion centered on the subject of wood-block paving. A special report which was read on wood-block preservative specifications by S. R. Church produced considerable opposition, owing to the fact that the proposed specification was a broad one and would let in nearly every kind of oil derived from coal, gas or coke-oven tar. It was contended, however, that practically all oils gave equally good protection against decay, so that there was no necessity to quibble over the oil specifications when the real difficulty lay in getting a proper treatment. The manufacturers of water gas considered that provision should be made for their oil and presented a long brief in support of this contention, but the committee members answered that as yet they had not become acquainted with sufficient records to warrant advocating its use. By a close vote the proposal to adopt the specification as a standard for the society was defeated, but the report was received as information and referred to the standing committee on preservatives. Following this the report of the committee on wood-block paving which was printed in last week's issue was subjected to so many suggested changes from the floor that it was referred back to the committee for the ensuing year.

During the course of the business session of the association which followed the technical meetings the publication of a manual of suggested practice was urged. This plan was provided for last year, but it has not yet been carried out. Also, President Waterman suggested that a research committee be formed to investigate all new methods, whether patented or not. A new constitution was adopted providing for probate membership instead of junior membership, the probate members being eligible for corporate membership within five years. The time of the annual meeting was changed to the fourth Tuesday in January to avoid the conflict with the meeting of the American Society of Civil Engineers, and a letter ballot for the election of officers was adopted.

The secretary of the association reported a membership of 276, a gain of eleven over the previous year, and stated that the quarterly magazine, *Wood Preserving*, had cost the association about $390 net. A conference committee was authorized to work in co-operation with other organizations, with the idea of cutting down the number of requests sent out each year to various companies and engineers. New York City was chosen as the place for the next annual convention.

The officers selected for the ensuing year are as follows: President, Carl G. Crawford, general manager American Creosoting Company; first vice-president, John Foley, chief forester Pennsylvania Railroad; second vice-president, Morris A. Trumbull, vice-president National Lumber & Creosoting Company; secretary-treasurer, F. J. Angier, superintendent of timber preservation Baltimore & Ohio Railroad; members of executive Committee, F. F. Pooler and A. R. Joyce.

Carhouse Design and Construction*

The Author Outlines Considerations Affecting Location, Architecture and Equipment of Modern Carhouses

BY C. F. BEDWELL
Assistant Engineer Public Service Railway of New Jersey.

THE selection of the site for a carhouse is an entirely different proposition from that of determining the location of a power house, repair shop or general maintenance of way headquarters. For a broad example, in the building of a new electric railway line tentative schedules are made and the number of cars necessary to operate that schedule for the time being is determined and an estimate made for the probable number of cars that will be required to take care of the increase in traffic and line extensions for twenty or thirty years. Thus having determined as nearly as possible the traffic and car requirements, a location for the carhouse is selected. This location first must be such that the non-revenue car mileage will be reduced to a minimum, so that when the car starts out on its run it will soon begin to earn money by picking up passengers and will not require expenditure of money for power and platform expenses due to dead mileage. The same holds true when the time comes to pull the car in.

Generally, for city and suburban service, it is found best to locate the carhouse at or near the end of the line, or at the first terminal point, and if the trolley line runs from one town to another the carhouse might be located to advantage midway between the towns or at a point where traffic is light.

When the location for the carhouse is determined upon, the actual site should be investigated carefully as to its physical condition, the nature of the soil, what means there are or what means can be provided for drainage, what provision can be made for adequate water supply for fire protection, how the property grades and investigation should be made as to possibilities of obtaining franchises for track connections from the municipal officials. But, of course, the selection of a site is more or less determined by the value of the real estate and available property in the desired neighborhood. Sometimes it appears to be more economical to buy a comparatively poor piece of property for a lesser sum, and, with a nominal expenditure for grading and drainage, it can often be made of equivalent value for carhouse purposes as another piece of property of higher cost; that is, high and dry. It certainly is not desirable to pick out a site for a carhouse in a swamp or on the side of a mountain, or where an excess of rock will be encountered in excavation.

The physical layout of the property and track arrangements have a great deal to do with the design of the carhouse. In fact, the operation of cars and track layout has always been given first consideration, and the design is made to meet the ideal layout as far as possible. At an operating carhouse a saving of time is of the utmost importance, and the track layout should be designed with that point in view. The planning of the track should be such that there will be no interference between incoming and outgoing cars, the loop operation being, naturally, the most convenient, and the installation of "Y" tracks, where the entrance and exit from the carhouse connects with the main line, provides for most flexible operation. The connections from the carhouse to the main operating line should be, of course, as few as possible in order to minimize special work in the operating tracks. Great care should be taken in the design of track work and building so that ample clearance is allowed between cars and all nearest points, so as to minimize the possibility of accidents. Another primary condition to be kept in mind in the design of a carhouse is that of providing for proper drainage. The grade of the tracks in the building and yard should be such that ample drainage can be provided so as to prevent any possibility of storm water entering the building.

The older carhouses on a great many properties throughout the country are very beautiful examples of architecture, but are laid out with no regard at all for satisfactory and economical operation. In fact, I know of one, only recently built in the Middle West, that is completely covered, even to the special work leading into the building. In this arrangement there is only one narrow opening controlling the carhouse, which is exceedingly bad for operation and worse from a fire hazard standpoint. It is a most uneconomical design, as there is certainly no need of inclosing a lot of special work upon which cars cannot be stored.

At the Hilton carhouse of the Public Service Railway the building covers only such an area as can be occupied by cars, and all the special work, entrance tracks, etc., are outside of the building. This gives also an excellent example of economical operation, the cars pulling in at one end and leaving at the other. Thus little or no time is lost in switching. But, even since this carhouse was built, there has been a great deal of discussion among railway men as to the advisability of housing all the cars in a building or storing them in an open yard, and it is now generally conceded that the housing of all the cars is not necessary. Most cars are on the street or road the greater part of the day, and as the buildings are costly and the insurance on cars in a carhouse is more than in an open yard, the saving in deterioration of the car, by having it under cover one-fourth of the time, is not enough to offset the carrying cost of the building and additional insurance. As a consequence, the most recent layouts provide an administration building fully equipped for all comforts, conveniences and entertainment for the trainmen, and also ample shop facilities and a number of inspection pits, all under cover, closed in and heated, but no storage. Consequently a car may be run in the shop bay to have inspection and minor repairs made and is then run out and stored in the open, or perhaps not stored at all but put immediately on the streets.

The equipment for fire protection of a carhouse is most important. The value of the building is insignificant compared with the value of the cars stored therein, so that certain rules have been laid down by the insurance authorities limiting the number of cars to be stored in any one bay. There has also been considerable discussion as to insurance rates for buildings equipped with automatic sprinklers and various types of roofs. It has been conceded that carhouses with mill-constructed roofs, or with steel trusses incased in concrete, should have roof sprinklers as well as aisle sprinklers. With reinforced concrete roofs it has been conceded by the insurance authorities that the roof sprinklers may be omitted without involving a higher rate of insurance than that of a mill type of construction.

The cost of a building to house 100 cars with mill-constructed roof should be $150,000; the cost to house 100 cars with reinforced concrete roof should be $180,000. By adding $25,000 for the cost of both roof and aisle sprinklers to a mill-constructed carhouse the cost would become, say, $175,000. By adding $15,000 for the cost of aisle sprinklers alone to a reinforced concrete building, the cost would become $195,000. Therefore it seems that, except from a point of permanency, a

*Abstract of a paper read before the Public Service Company Section of the American Electric Railway Association, on Jan. 20, 1915.

building with reinforced concrete roof has no special value over one with a mill roof.

At all carhouses, whether equipped with an automatic sprinkler system or not, it is necessary to provide adequate standpipes and connections for fire hose; also plenty of water buckets, sand pails and fire extinguishers and a fire alarm system, as it is generally possible to put out a fire with the local fire squad, organized among the carhouse employees, before it gains sufficient headway to operate automatic sprinklers. At each carhouse and shop are held periodical and systematic fire drills, so that each employee has a certain routine to follow in case of fire. Some men are designated to station themselves at the fire hydrants, others to start the pumps where pumps are necessary, others to handle the sand pails and hand extinguishers, and other men to run the cars free from the building in a systematic manner. The Public Service Railway has been fortunate in having very few fires, all of which is, no doubt, due to the care which is taken to keep the buildings clean and free from rubbish, with the provision of fireproof oil houses and the use of fireproof receptacles to contain rubbish, oily waste and other inflammable materials, along with the general fireproof construction of the buildings.

A most excellent set of rules has been prepared by the American Electric Railway Association and adopted as recommended practice for fire protection in carhouses. These rules have had the approval of the National Board of Fire Underwriters and the National Fire Protection Association, and have been adopted by the Public Service Railway and followed out on all of our properties. If these rules were strictly adhered to in every respect, I doubt whether we would ever have a fire on our properties.

C. E. T. A. Statistics

Annual Report of Chairman of Central Electric Traffic Association Shows a Busy Year

AT the annual meeting of the Central Electric Traffic Association on Jan. 18, Chairman A. L. Neereamer presented a statement of its activities for the year ended Dec. 31, 1915. Some of the more interesting of the figures follow:

In accordance with the new constitution, adopted at Fort Wayne on April 20, 1915, only five meetings were held during the year, instead of ten as formerly. The membership now consists of forty-six lines, representing 3574 miles. This is a decrease of one line and 52 miles from last year. Forty-three lines participate in the joint and local baggage tariff and thirty lines in the joint passenger tariff, including the interchangeable mileage ticket. Up to date, 33,100 interchangeable mileage tickets have been issued, and of this number 5100 were issued during the year that has just passed.

Official classification No. 42 was filed by the chairman for thirty-nine lines, and twenty-three supplements were issued to this classification. By the filing of this publication through the chairman's office, it was only necessary for eight applications for special permission to be filed with the various commissions. If this publication had been filed by individual lines, 312 applications would have been necessary.

Official classification No. 43 was issued on Nov. 22, 1915, and became effective on Jan. 1, 1916, in all States except Indiana. It will probably be made effective in that State by the Public Service Commission when it makes the steam railroad classification effective. Other schedules issued during the year by the association were: Official Interurban Railway Equipment Register No. 3; Joint Freight Tariff No. 11 and one supplement to the latter, effective in Indiana only, and two supplements to the Joint Passenger Tariff No. 14.

Revisions on the official interurban map have been completed, and it is now in the hands of the member companies.

Railway Accidents for 1915

A Summary of the Casualties to Persons on Electric Railways Is Published, Together with the Causes of Accidents

THE Interstate Commerce Commission in its recently-published Accident Bulletin No. 56 has compiled a record of accidents due to collisions, derailments and other causes resulting in injuries to persons which arose from the operation of all railways used for interstate commerce during the year ended June 30, 1915. A summary showing the casualties to persons on electric railways appears in the accompanying table. This gives a total number of persons killed and injured for the year that is materially less than the corresponding figures for 1914, although the reduction from the totals of 1913 is small.

During the year the number of major accidents due to collisions on electric railways covered by the investigations of the Interstate Commerce Commission was 136, while the number of derailments was seventy-three. On the other hand, the steam railways of the country for the same period experienced a total of 3538 collisions and 6849 derailments, there being about twice as many derailments as collisions. Some of these accidents were investigated by the commission, the results in the most important cases being summarized in the bulletin. The summary shows that out of a total of sixty-seven investigations, no less than eleven accidents were due to disregard of superior trains. Two were due to neglect of orders by train crews and three to dispatchers' failures. Five were caused by disregard of flagging rules and two by disregard of fixed signals. Among the other causes were three accidents due to excessive speed, three to broken rails, thirteen to other track failures, six to unknown causes, eight to equipment failures, six to maliciousness and five to miscellaneous causes.

ACCIDENTS ON ELECTRIC RAILWAYS, YEAR ENDED JUNE 30, 1915

Causes	Number of Accidents	Passengers		Employees on Duty		Other Persons Not Trespassing		Trespassers	
		Killed	Injured	Killed	Injured	Killed	Injured	Killed	Injured
Train Accidents:									
Collisions	136	9	596	6	79	1	20	...	...
Derailments	73	..	169	3	31	...	9	...	...
Other accidents to trains	2	..	4	..	1	...	...	...	...
Total	211	9	769	9	111	1	29	...	...
Other Than Train Accidents:									
Coupling or uncoupling cars	..	..	...	..	14	...	...	...	...
Doing other work about trains	..	..	...	3	187	...	...	...	...
Coming in contact, while riding on cars, with fixed structure	..	..	21	..	21	...	...	...	...
Falling from cars or engines	..	10	64	7	65	1	3	2	5
Getting on or off cars or engines	..	14	1127	..	69	...	22	1	11
Other accidents on or around trains	..	..	388	1	14	1	33	..	6
Being run over at stations or yards	..	2	4	1	6	10	30	8	7
Being run over at highway grade crossings	..	..	...	..	...	120	669	...	2
Being run over at other places	..	..	5	3	8	56	330	85	68
Other causes	..	..	87	..	6	5	27	7	7
Industrial accidents to employees	..	..	...	16	932	...	...	...	...
Grand total	...	35	2465	40	1433	191	1118	103	106

MIDYEAR MEETING
CHICAGO
FEBRUARY 4, 1916

ASSOCIATION NEWS

MIDYEAR MEETING
CHICAGO
FEBRUARY 4, 1916

Meetings of the Committees on Way Matters, Equipment, Schedules and Time-Tables, Training Transportation Employees and Valuations Are Reported—The American and Manufacturers' Associations Jointly Issue Circular on Proposed Changes in Constitution

Activities of the Committees

WAY MATTERS

A meeting of the committee on way matters was held at the association headquarters in New York on Jan. 20 and 21. All members were in attendance except W. F. Graves, who was ill. Special work manufacturers had found some objections to the specifications that were submitted by the 1915 committee for adoption as standard. Victor Angerer, William Wharton, Jr., & Company; G. A. Peabody, Cleveland Frog & Crossing Company; F. M. Stockwell, Barbour-Stockwell Company; W. G. Nichols, The Edgar Allen Manganese Steel Company, and B. L. Weaver and G. S. Vickery, Pennsylvania Steel Company, attended the meeting and presented some changes for consideration. The size of the coupon in connection with the solid manganese steel specification, and the time of the coupon heat treatment were the points at issue. After considerable discussion the changes suggested by the manufacturers were accepted by the committee. This specification was also amended to the effect that the wind or warp in the bearing surfaces of solid manganese steel special work should not exceed ⅛ in. in 5 ft. Provision was also made for solid manganese steel special work installed on steel ties or steel supporting structures. In this connection it was recommended that special care should be taken to obtain truer bearing surfaces than were necessary for layouts placed on wooden ties.

The revision of the recommended design of 7-in. and 9-in. joint plates, with special reference to the sizes of bolt holes and fits, was assigned to a sub-committee for report. Further consideration of recommended symbols for recording surveys was assigned to E. M. Haas, Chicago, Ill. In connection with designs for layouts of switches, mates and frogs, the committee decided to prepare standard spirals for 80-ft., 100-ft., 200-ft., 300-ft., 350-ft. and 400-ft. radius curves. Under this subject the question of the over-all lengths of switches, mates and frogs is to be investigated so that standard lengths may be submitted for adoption.

L. A. Mitchell, Anderson, Ind., will consider and report on ballast for suburban and interurban track. B. J. Fallon, Chicago, Ill., will investigate and report on the use of rolled manganese and other alloy steel rails. C. H. Clark, Cleveland, Ohio, with the assistance of other committee members, will investigate the use of high elastic limit steel machine bolts, and he will have some special tests made to determine their value as compared with ordinary track bolts. Specifications covering the manufacture and installation of various types of pavements were assigned to A. E. Harvey, Kansas City, Mo. Specifications for preservatives and treatment of woods for inclusion in the engineering manual were assigned to E. M. Haas. The preparation of specifications with definitions for sundry track materials was reassigned to C. W. Gennett, Jr., of the 1915 committee, who has been considering this subject in connection with a report being prepared by the American Society for Testing Materials. The subject of efficient types of hand track tools was divided into those employed in excavation, ballasting, track laying and paving, and it was assigned to different committee members.

Mr. Schreiber reported on the progress of the sub-committee on bibliography. The work has all been compiled, and the pamphlet on this subject is ready to print. The committee decided to print at the present time 1000 copies and to hold the type for six months, and possibly longer, to see what demand develops. The committee decided to recommend that the association provide each company with one copy and a price of 50 cents each should be set for all copies sold.

EQUIPMENT

The mid-winter meeting of the committee on equipment was held in New York on Jan. 26, there being present W. G. Gove, chairman; L. M. Clark, vice-chairman; H. A. Johnson, E. W. Holst, R. H. Dalgleish, W. E. Johnson, J. S. McWhirter and W. W. Brown. By invitation, Messrs. Storer and Broomall of the Westinghouse Electric & Manufacturing Company, Priest of the General Electric Company and Trist of the Carnegie Steel Company were in attendance during part of the session. The meeting was devoted primarily to progress reports of the various sub-committees to which had been assigned the different subjects to be taken up in the committee report, so that an opportunity could be provided for a discussion of the work of each sub-committee by the committee as a whole.

The subject of axle design, which had been assigned to Messrs. W. E. Johnson and Holst, resulted in an extended discussion which centered largely on the advisability of retaining a keyway in the present standard drawing, owing to the decrease in popularity of the split gear, and on this point it was decided that provision for the needs of those who wished to retain split gears could be best made by a note covering the matter, thus eliminating the keyway in accordance with the most approved practice. It was decided also to incorporate in the present designs a smaller size of axle to meet the requirements of light-weight cars and small motors. With regard to the question of motor ratings for axles, it was the consensus of opinion that this could well be eliminated from the present standard specification.

In regard to the standardization rules of the American Institute of Electrical Engineers, W. W. Brown raised the question of a possible change in the test voltage that was specified owing to the fact that manufacturers were using a much higher voltage at present. He also cited the need for two grades for stranded flexible cables because of the different requirements for permanent cables and for those subject to movement such as motor leads and jumpers. Mr. Brown also reported tentatively upon standard sizes for carbon brushes, but in this connection it was the consensus of opinion of the committee that the gain to be accomplished by standardizing brush sizes was insufficient to overcome the difficulties in design that would follow the

use of arbitrary dimensions. In consequence the subject was dropped.

In the matter of wheel tread and flange contour design, Mr. Dalgleish submitted tentative drawings covering changes in the present standard and adding a 5/8-in. flange for use only in low-speed city service, this being considered important because, in general, electric railways were buying about as many wheels with 5/8-in. flanges as with the standard 3/4-in. flange. An extended discussion took place on this matter as well as upon the desirability of making the flange less blunt and giving the tread less slope, or cone, to provide a longer contact line for new wheels on the rails. It was decided finally, inasmuch as the subject was of such vital importance to track engineers, that the sub-committee should confer with the committee on way matters and report at the next meeting. Messrs. W. E. Johnson and Holst then reported the results of a sub-committee meeting held on Jan. 25 with the manufacturers' representatives on the subject of brakeshoe design. A number of changes in the present standard design were proposed, as well as the addition of two new designs, one for 28-in. and 26-in. wheels and one for diameters of 24 in. and smaller.

Following this Mr. McWhirter made a tentative report on the influence of rolled-steel wheels on rail corrugation, citing results of an investigation in which he had found that in Pittsburgh, the home of steel wheels, no trouble from corrugation had been experienced, but that in Baltimore, where all wheels were of cast iron, corrugation had been extremely bad. Mr. Dalgleish reported progress on the preparation of a standard limit-of-wear gage, and Mr. Holst outlined his plans for a report on car ventilation. In regard to the subject of street car lighting, Mr. Clark proposed to confine his report to direct lighting methods, as indirect lighting appeared to be impracticable, and commented also upon the superior maintenance of high-capacity lamps with large filaments. He reported also upon a revision of the standard journal brass design, submitting drawings for a semicircular brass which was interchangeable with the present standard brass and box. The subject of car painting, which was being handled by H. A. Johnson, was then discussed at length, and an outline for the procedure to be followed in covering the matter in the committee's report was decided on. This was followed by a discussion of the tentative code of safety rules that had been submitted by the National Bureau of Standards, the consideration of which had been assigned to Mr. Brown, and at its conclusion the committee adjourned, the date and place of the next meeting being left subject to the decision of the chairman.

SCHEDULES AND TIME-TABLES

At the meeting of the committee on construction of schedules and time-tables, which was held in New York on Jan. 27, there were present Edward Dana, chairman; H. P. Fritch, J. P. Kineon and A. E. Hicks. The committee went over the past reports that had been made in order to draw up a tentative outline of information which, it was believed, should be secured before definitely studying the subjects assigned. A data sheet was then drawn up to be sent to member companies for the purpose of obtaining information necessary to the committee's work. The subject of running time was assigned to Mr. Kineon, who is to collect the data that are returned to the secretary's office in order to make definite progress at the next meeting. The study of traffic regulations was assigned to Mr. Hicks and the revision of the interurban time-table was assigned to Mr. Fritch. The subject of relation of stops to schedule speed was assigned to Mr. Dana.

TRAINING TRANSPORTATION EMPLOYEES

On Jan. 27 a meeting of the committee on training transportation employees was held in New York, N. W. Bolen, chairman, and C. B. Buchanan being present. The meeting was devoted largely to a discussion of the subjects that have been assigned to the committee and to the best method of co-ordinating the work that has been done by past committees. It was decided to assign the work of preparing data sheets and collating the information received in the replies on the subjects of watch-inspection methods and on eyesight tests and examinations to sub-committees. The appointments to these sub-committees will be made later by Mr. Bolen.

COMMITTEE ON VALUATION

A meeting of the committee on valuation of the American Association was held in New York on Jan. 25. All of the members of the committee were present with the exception of H. H. Crowell and B. E. Tilton. The preparation of a paper on unit costs and overhead charges was discussed, and P. J. Kealy, Kansas City, Mo., agreed to prepare a synopsis for a paper on this subject.

Circular on Changes in Constitution

CIRCULAR OF MANUFACTURERS' ASSOCIATION

The American Electric Railway Manufacturers' Association is sending this week to its members a statement of the correspondence on the proposed changes in the Manufacturers' Association and the action of its executive committee on the plan. The statement follows:

American Electric Railway Manufacturers' Association

New York, Jan. 18, 1916.

Please Read Carefully—Most Important

To All Members:

At the meeting of the American Electric Railway Association held in San Francisco, Cal., on Oct. 4 to 8, inclusive, 1915, retiring President Allen recommended that the Manufacturers' Association become an affiliated instead of an allied association, reporting to and under the jurisdiction of the American Electric Railway Association.

The American Electric Railway Association appointed a special committee to take up the recommendations made by Mr. Allen, and representatives of the Manufacturers' Association were invited to be present at a meeting of this committee held on Dec. 15, 1915, to present their views on the subject.

The committee representing the Railway Association and the Manufacturers' Association met on Dec. 15, 1915. Subsequent to this joint meeting the following letter was received from Secretary E. B. Burritt of the American Electric Railway Association:

Mr. H. G. McConnaughy, *Secretary.*
American Electric Railway Manufacturers' Association,
New York, N. Y.

Dear Mr. McConnaughy:

I beg to advise you that at the meeting of the Executive Committee, held here on Dec. 16, last, the special committee appointed to consider recommendations contained in the President's address made its report as per copy enclosed.

Following the approval of this report, a resolution was adopted calling a special meeting of the Association, to be held at the Congress Hotel, Chicago, Ill., on Feb. 4, 1916,

beginning at 10.00 a. m., for the purpose of acting upon amendments to the Constitution and By-Laws of the Association, as recommended by the special committee. Accordingly, a notice, copy of which I am enclosing herewith, was sent to all of our Company Members calling the meeting. I am sending you under separate cover, a sufficient number of copies of this special notice for distribution among your Member Companies should you so desire.

In this connection I would call your attention to the fact that all of the features of the proposed plan will be subject to amendment at the Midyear Meeting. It may be adopted in its entirety, or it may be rejected, or modifications of the plan may be adopted.

Briefly expressed, our Officers and others favoring the proposition feel that the Association should carefully consider all the features of the proposed amendments and if they are adopted, to adopt them in such form as will give a united organization, carrying the strength and influence resulting from such unity and bringing forth an organization in which both Manufacturers and Railway men may work together as one body for the general prosperity of the organization and for the advancement of the industry in which they are all equally interested.

Yours very truly,
(*Signed*) E. B. BURRITT, *Secretary.*

The following is a copy of the report of the special committee from the Railway Association of which Arthur W. Brady is chairman:

To the Executive Committee of the
American Electric Railway Association.

GENTLEMEN:

The Committee appointed to consider the recommendations made by President Allen at the recent Convention in San Francisco, begs to report as follows:

We have carefully considered the recommendations favoring an affiliation of the American Electric Railway Manufacturers' Association with the American Electric Railway Association as are the Engineering and other affiliated associations, and in that connection have conferred with representatives of the Manufacturers' Association as well as with Officers and others of the American Electric Railway Association.

In our judgment, it is very desirable that there be a closer relationship than has heretofore existed between those who manufacture and sell the apparatus and material necessary to electric railway operation and the American Electric Railway Association for the purpose of creating a clearer recognition of and of advancing the common interests of both. We do not believe that such closer relationship can be secured in the fullest degree so long as the American Electric Railway Association and the American Electric Railway Manufacturers' Association continue to be, as they now are, wholly separate and independent organizations, but we regard it as necessary that the two associations be brought together into a common organization.

We therefore recommend that the Constitution and By-Laws be so amended that the membership of the Association be composed of Companies, firms and individuals engaged in the manufacturing or sale of electric railway material and apparatus as well as of electric railway companies, the membership of both to be upon a basis of equality; and that a scale of dues for manufacturers and dealers be established upon such an equitable basis as may be approved by the Executive Committee; and that there be formed an affiliated association consisting either of the present American Electric Railway Manufacturers' Association or of a new association, as may seem best, with which those connected with the manufacturing and selling interests of the industry may affiliate, if they so desire, without, however, diminishing the right of affiliation, if preferred, with any other of the affiliated associations as now.

Respectfully submitted,
(*Signed*) ARTHUR W. BRADY, *Chairman.*

Dec. 16, 1915.

The following is a copy of notice issued by the American Electric Railway Association under date of Dec. 31, 1915:

NOTICE OF SPECIAL MEETING

To Company Members:

In accordance with a resolution adopted by its Executive Committee at a meeting held in New York on Dec. 16, 1915, a special meeting of the American Electric Railway Association is hereby called to convene at the Congress Hotel and Annex, Chicago, Ill., on Feb. 4, 1916, at 10.00 a. m., for the purpose of considering and acting upon the amendments to the Constitution and By-Laws of the Association as recommended by the special committee to consider recommendations made by the President at the San Francisco Convention.

The amendments having received the required approval of the Executive Committee, are, in accordance with Article IV of the Constitution and Article XIX of the By-Laws, herewith submitted for your consideration, the changes being indicated in italics.

Amend Article III of the Constitution as follows:

In the first line of the first paragraph, strike out the word "three" and substitute therefor the words "the following."

Amend Section (*a*) by adding after the word "sections" in the third line, the following: "and of companies, firms or individuals engaged in the business of manufacturing or selling apparatus equipment or supplies used in electric railway operation," so that the first paragraph and Section (*a*) of Article III shall read as follows:

"III. The membership of this Association shall consist of *the following* classes:

"(*a*) Company members, consisting of American urban and interurban railway companies, or lessees, or individual owners of urban and interurban railways, or steam railways having electrified sections, *and of companies, firms or individuals engaged in the business of manufacturing or selling apparatus, equipment or supplies used in electric railway operation.* Each member company shall be entitled to one vote, which shall be cast by the properly accredited delegate."

Amend Article XIV of the By-Laws so far as said article relates to fees of company members, by striking out the word "active" in the first line and substituting therefor the word "company," and by inserting after the word operation in the third line the following: "or from the business of manufacturing or selling apparatus, equipment or supplies used in electric railway operation," and by striking out the word "companies" in the fourth line and substituting therefor the word "members" so that the first paragraph of Article XIV shall read as follows:

"XIV. *Company* members shall pay an admission fee of Ten Dollars ($10.00) and annual dues payable in advance based on gross earnings from electric railway operation, *or from the business of manufacturing or selling apparatus, equipment or supplies used in electric railway operation* during the preceding fiscal year of the respective *members* as follows:

Gross Receipts.			*Annual Dues*
Under	$50,000		$25
Between	50,000 and	$100,000	50
Between	100,000 and	250,000	75
Between	250,000 and	500,000	125
Between	500,000 and	1,000,000	175
Between	1,000,000 and	2,000,000	225
Between	2,000,000 and	3,000,000	275
Between	3,000,000 and	4,000,000	325
Between	4,000,000 and	5,000,000	375
Between	5,000,000 and	6,000,000	425
Between	6,000,000 and	7,000,000	475
Between	7,000,000 and	8,000,000	525
Between	8,000,000 and	9,000,000	575
Between	9,000,000 and	10,000,000	650
	10,000,000 and	over	750

Respectfully submitted,
E. B. BURRITT, *Secretary.*

Dec. 31, 1915.

REPORT OF SPECIAL COMMITTEE OF MANUFACTURERS' ASSOCIATION

The committee acting for the Manufacturers' Association, as appointed by President Finigan and composed of: Charles C. Peirce, vice-president in charge of Relations; B. A. Hegeman, Jr., *Joseph R. Ellicott, *W. L. Conwell, *William H. Heulings, Jr., *Cornell S. Hawley, *Edwin H. Baker, rendered the following report covering their position as taken at the joint meeting held Dec. 15, 1915:

**Past President*

NEW YORK, Jan. 18, 1916.

MR. THOMAS FINIGAN, *President,*
American Electric Railway Manufacturers' Association.

DEAR SIR:

The Committee undersigned appointed by virtue of your call under date of Nov. 27, 1915, desires to render the following report:

"Pursuant to the invitation extended by the Committee of the American Electric Railway Association, your Com-

mittee met in conference with the Committee from the said American Electric Railway Association, on Dec. 15, 1915.

"The advantages pro and con of a closer relationship between the two Associations were discussed from every possible angle. The advantages as represented by the honor conveyed to our Association and its individual members received hearty expressions of appreciation.

"We would as individuals heartily welcome a Charter under the Parent Association and the privilege of a voice on the Executive Committee of the American Electric Railway Association, indicating our anxiety to work in harmony with and to the best interests of the Parent Association.

"We contended, however, that the finances of the Manufacturers' Association remain intact and independent of theirs and the dues of and assessments on our members should be collected for the sole purpose of meeting the expenses of our Manufacturers' Association as they now appear.

"*The disadvantages were many and manifest, and your Committee, therefore, unhesitatingly recommended that at the present time the disadvantages far outweigh the advantages, and we are reluctantly compelled to report adversely to the plan as a whole.*

Very truly yours,
(*Signed*) CHAS. C. PEIRCE, *Chairman.*"

The Executive Committee of the Manufacturers' Association met and approved the report of the special committee from the Manufacturers' Association, which was done in the belief that this action would represent the sentiment of the entire membership of the Manufacturers' Association.

We feel that it is the duty of the Executive Committee to bring all these matters before the Member Companies of the Manufacturers' Association for their information and with the thought that if they care to do so they can have their representatives present at the meeting of the American Electric Railway Association to which they have been invited and which meeting will be held at the Congress Hotel and Annex, Chicago, Ill., at 10 a. m. on Friday, Feb. 4, 1916, for the purpose of expressing their views on this subject.

A supplementary report will be rendered to each member company should further action be taken in these premises.

Respectfully submitted,
EXECUTIVE COMMITTEE,
American Electric Railway Manufacturers' Association,
H. G. MCCONNAUGHY, Secretary.

CAPITAL TRACTION SECTION

At the organization meeting of company section No. 8, which was reported in last week's issue, R. H. Dalgleish, electrical engineer of the company, was elected president and John Fleming, purchasing agent, was elected secretary. The following information relates to the careers of these men, and portraits of them are reproduced herewith.

Mr. Dalgleish, who is forty years of age, has always been a resident of Washington. He attended the public schools of that city, and also the Corcoran Scientific School, later joining the mechanical department of the Eckington & Soldiers' Home Electric Railway, which he left to enter the electrical department of the Capital Traction Company. He acted as electrical engineer of this company since 1906, but was officially appointed to the position this month. Mr. Dalgleish is a member of the Washington Society of Engineers, the Washington Traffic Club and the equipment committee of the American Electric Railway Engineering Association, and he is also chairman of the Washington section of the American Institute of Electrical Engineers.

Mr. Fleming is one year younger than Mr. Dalgleish. He attended the public schools in Philadelphia and Washington, leaving school to enter the machine shop of the Washington & Georgetown Railroad, which later became the Capital Traction Company. This he did in 1893, transferring a year later to the general offices of the company as stenographer and clerk, afterward becoming private secretary to the general manager. In 1909 he was made storekeeper of the company and last year was appointed purchasing agent.

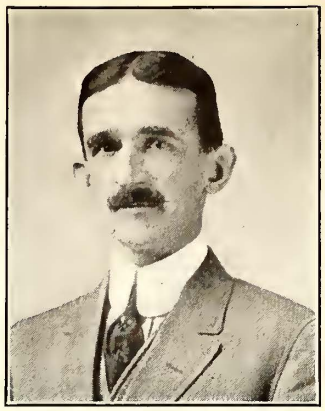
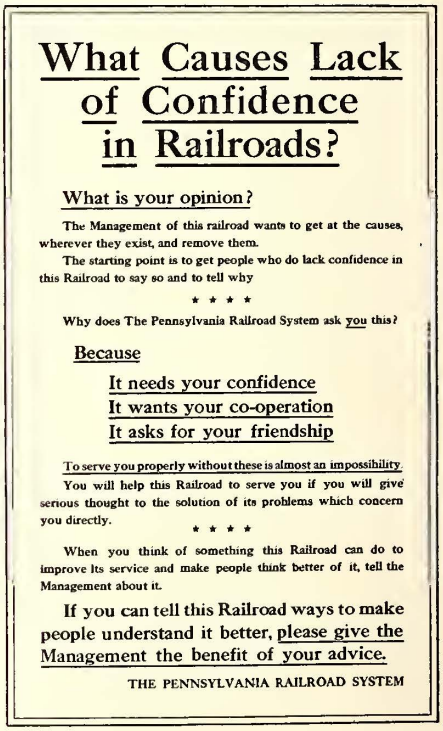


Photo by Clinedinst, Washington
R. H. DALGLEISH
President Capital Traction Company Section

Photo by Bachrach, Washington
JOHN FLEMING
Secretary Capital Traction Company Section

Asking the Public for Advice

PUBLIC relations is a broad subject, and one to which utilities are to-day constantly devoting more study. The problems arising in this connection from steam railroad operation are to a large degree similar to those coming up in electric railway operation, and it is worth while for each set of carriers to see what the other is doing in the way of establishing better public relations. Along this line it may be noted that the Pennsylvania Railroad, which has long occupied one of the foremost places in steam railroad publicity, is now displaying in all the public places of its system large white posters, printed in red and black ink, which, as shown herewith, invite the public's advice and criticism and seek its confidence. It is undoubtedly a sensible idea, thus to take patrons into partnership and endeavor to secure their co-operation, but the question arises as to whether or not they will be sensible enough to make intelligent and practical suggestions. At any rate, the matter is put squarely up to them, and the effort of the railroad deserves to meet with better results than mere skepticism.



POSTER ISSUED BY THE PENNSYLVANIA RAILROAD ASKING THE PUBLIC FOR ADVICE

COMMUNICATIONS

Proposed Changes in the Constitution

ANDERSON, IND., Jan. 25, 1916.

To the Editors:

At the special meeting of the American Electric Railway Association to be held in Chicago on Feb. 4, a vote will be taken on proposed amendments to the constitution and by-laws of the association so as to admit to membership companies, firms or individuals engaged in manufacturing or selling apparatus, equipment or supplies used in electric railway operation. It seems proper at this time to state briefly the reasons which caused the committee appointed to consider the recommendations made in retiring President Allen's address at the San Francisco convention to recommend those amendments to the executive committee.

The controlling reason is found in the conviction that the time has arrived for full recognition of the fact that the fundamental interests of those owning or operating electric railway properties and those engaged in manufacturing or selling the apparatus and other things essential to electric railway existence and operation are identical, and that the protection and advancement of those interests require the harmonious efforts of owners, operators, manufacturers and dealers through and as one organization.

There can be no question as to the soundness of the first proposition. The prosperity of electric railway properties and the prosperity of electric railway manufacturers and supply men rise or fall together. Real prosperity of the one class necessarily means prosperity of the other.

The only serious question is, therefore, how can these common interests best be guarded and forwarded? Shall it be through one organization, of which all in interest are members, or, as now, by two organizations, calling themselves allied but separated as to offices, committees, headquarters, treasuries and meetings?

The committee, which conferred at length with the representatives of manufacturers and supply men, as well as of the electric railway companies, believes that the argument favors the recognition in organization of the identity in interest which exists in fact, and that the American Electric Railway Association should so broaden its requirements for membership that all in the classes mentioned should be admissible as members on a basis of substantial equality.

No criticism of the American Electric Railway Manufacturers' Association is involved in reaching this conclusion. That association has done valuable work to further the interests of the electric railway industry, and the relations between it and the American Electric Railway Association have been as harmonious and mutually helpful as could be the case where two independent organizations are concerned. The field of the American Electric Railway Association has, however, wonderfully broadened in the past decade. Ten or fifteen years ago the problems of construction, maintenance and operation absorbed practically all the energies and activities of the association. The trend of the times has, in the meanwhile, compelled the association to devote its labors and attention largely to other questions, going to the very existence of the industry. Grave problems affecting the relations between the public and the electric railways confront us and must be solved whether we like the task or not. It is of equal importance to electric railway owners and operators and to electric railway manufacturers and dealers that these problems be solved right. The strength of the industry cannot be fully exercised to bring about a correct solution when the possessors of that strength occupy different houses and only from time to time confer together to ascertain what shall be done or attempted, and how. It is in unity that there is strength.

The suspicion doubtless exists on the part of some manufacturers and supply men that the purpose behind the proposed amendments is merely to secure for the American Electric Railway Association the financial aid of those who now constitute the Manufacturers' Association. That suspicion is without basis. There are unquestionably matters—notably that connected with payments for convention location—that can be better handled by one association than by two. In respect to others there should be little difference in the use to which any money contributed is devoted save with respect to the result of the expenditure, which should in almost every case be greater. The fact that one dollar expended by the common organization will go farther than two half dollars expended by two organizations is a good reason for the consolidation of expenditures.

The amendments proposed are not presented as perfect. The committee worked under pressure, and it was necessary to prepare something quickly in order that the amendments might be sent out in time for consideration at the mid-year meeting, in accordance with the constitution and by-laws. At the meeting the amendments as proposed will doubtless be fully discussed, and will be modified, if deemed best, as the members present may determine.

The matter of a unification of the organized efforts of the electric railway industry, considering that industry broadly, is one of very great importance. There is no disposition on the part of anyone to reach a hasty or arbitrary decision. It is the expectation of the committee that at the Chicago meeting the matter will be discussed thoroughly and dispassionately, that self-interest will be laid aside, and that the action taken will reflect the best judgment of those present as to the course which should be pursued.

ARTHUR W. BRADY, Chairman,
Committee on Recommendations in President's Address.

Maintenance of Coasting Recorders

INTERBOROUGH RAPID TRANSIT COMPANY
NEW YORK, Jan. 23, 1916.

To the Editors:

The annual cost of keeping our coasting recorder records, per motorman, is $11.455 for clerical labor and $1.222 for stationery, and the annual maintenance cost of recorders themselves is $6.756 per recorder.

In the subway, the use of these recorders caused a reduction in power of 16.8 per cent, and on the Manhattan elevated, of 10.4 per cent. The total amount of money which may be considered to have been saved depends upon whether the figures are based on the cost of coal and water alone, or on the total investment for power. It is, of course, the cost of the water and coal alone which would show in the actual yearly accounts. On this basis, the saving in the subway was $174,000 per year and on the Manhattan elevated $67,000 per year. Assuming that any reduction in the amount of power used would indirectly affect the total investment, the saving for the subway was $622,000 per year, and for the elevated, $239,000. The increase in coasting time brought about the use of these recorders is caused not only by the shorter time during which power is used but also by the shorter period during which the brakes are being applied, and this adds materially to

the life of the brakeshoes. We estimate this saving as more than 40 per cent, or a total of $36,000 for the subway and $16,000 for the elevated.

The total expense in connection with the recorders, including both the maintenance of the recorders and the keeping of the records, amount to somewhat less than 2 per cent of the saving effected. J. S. DOYLE,
Superintendent of Car Equipment.

Causes of Rail Corrugation

THIRD AVENUE RAILWAY

NEW YORK, Jan. 21, 1916.

To the Editors:

I have noted with much interest the articles in your issues of Dec. 25, 1915, and Jan. 8, 1916, in regard to rail corrugation, but I do not agree with the conclusions drawn, so far as the primary cause of corrugations is concerned.

From my own observations I am of the opinion that rail corrugations are the result of a combination of things, such as rapid acceleration, high speed, severe braking, in conjunction with the use of steel wheels.

Corrugations on surface roads were practically unknown ten or twelve years ago. At least, there was very little trouble that could be ascribed to them. About this period rolled-steel wheels or steel-tired wheels were generally introduced on surface roads. Since then they have been used very extensively. By their use flat wheels, which were so common with the chilled cast wheel, have been largely eliminated, but it seems to me that we have transferred the flats from the wheels to the rails.

My reason for forming this opinion is that up to 1908 there were no noticeable rail corrugations on the Third Avenue system on Manhattan Island. It was about this time that steel wheels were introduced, and shortly thereafter corrugations began to appear and developed very rapidly, becoming so serious and noisy that we received numerous complaints and found it necessary to file or grind them out.

On 125th Street the rails became so badly corrugated that, on the advice of steel experts and as the only means of preventing corrugations, we installed a new and heavier rail weighing 125 lb. per yard. But after this rail had been in service a few weeks it became as badly corrugated as the old. This rail is carried on a 6-in. x 6-in. longitudinal wooden stringer for its entire length.

After the cars on our Manhattan lines had been equipped throughout with steel wheels, the cars on our Bronx lines were similarly equipped. Corrugations appeared almost immediately, although up to that time the Bronx lines had been in operation about fifteen years without developing corrugations. Therefore it seems to me that if cars of approximately the same weight and speed are operated with chilled cast wheels for fifteen years without noticeable corrugations, and corrugations appear when steel wheels are substituted for the cast wheels, the trouble is not in the rails but in the wheels.

I am also of the opinion that double-truck cars with cast pony wheels and steel driving wheels make corrugations faster than any other type, as practically all of the braking is done on the driving wheels. Furthermore, corrugations may be encouraged by the nosing due to short wheelbase.

It is held, too, by some engineers that corrugation is due, at least in part, to the chattering of rolls at the mills. In other words, the new rail has incipient corrugations. Whether this is true or not, the chattering of the tools used to turn a steel wheel certainly does form on the tread very perceptible incipient corrugations. Therefore, if the steel wheel is ground after turning, at least one possible cause of corrugation would be removed.

Concerning the suggestion in the letter in your issue of Jan. 8 that modern track construction is responsible for corrugations, I would point out that some of our worst examples of corrugations are on tracks of the older type of construction which have been in service twelve to fourteen years. I have particularly in mind one stretch of corrugated track twelve years old consisting of 107-lb. rails, laid on wood ties, on dirt foundation, in granite pavement. This shows how impartially corrugations appear on the older as well as on the later types of track construction.

T. F. MULLANEY, Chief Engineer.

High-Carbon Steel and Rail Corrugation

THE CONNECTICUT COMPANY

NEW HAVEN, CONN., Jan. 7, 1916.

To the Editors:

The writer has read with much interest the paper on curved heads for girder rails and their bearing on rail corrugation, written by R. C. Cram and published in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 25, 1915.

It appears, from the information given in the article, that possibly the rapid corrugation noted might be due to the high carbon content of the rails investigated. To quote Mr. Cram's first conclusion: "1. Rail corrugation has become so general that it is being accepted with more or less complacency, and the rapid improvement in rail-grinding apparatus has made the removal of corrugations quite an easy matter, which has tended temporarily to divert attention from the study of its causes," and to his further statement, "of a case of very rapid corrugation which developed in a period of about five months," the rail referred to being high carbon steel, "treated with an alloy."

Again I quote: "Inasmuch as the development of corrugation to an equal degree had usually required from one to two years."

If the corrugation of a rail, standard as to section but differing in chemical properties and being high carbon, should appear in from 5/12 to 5/24 of the time that it did in a rail of the same section not as high in carbon, are we not "temporarily diverting our attention from the cause of corrugation" by looking elsewhere than to the increased hardness of the rail or the composition of the steel for its cause? And is not this borne out by the statement that it (corrugation) now "has become so general"? Since when has it "become so general"? Is it not since the introduction of harder steel? In other words, are we not paying more for harder steel so it will resist wear longer, and then, grinding out the corrugations formed, with special tools and skilled labor, in from 5/12 to 5/24 of the time formerly required?

It seems to me that Mr. Cram's paper shows that we are not gaining by the use of more costly steel, but are increasing the costs of both construction and maintenance.

We have recently made an inspection of corrugated rail on this company's lines, and find that it is confined mostly to rails 7 in. to 9 in. in height, in most cases of open-hearth steel with fairly high carbon content. It would appear that we are following a false lead in our efforts to cut down maintenance costs by using these higher-priced steels, which are perhaps not as fully suited to our needs. This would appear to be true if corrugations are now "accepted with complacency;" if now we are wearing out our rails with "expensive and wasteful grinding;" if now we are losing "0.001 in. per month," or 0.012 in. of head per year.

If I am not greatly mistaken, the old assumed head loss by wear was approximately ⅛ in. or 0.125 in. per five years, or 0.025 in. per year (Mr. Cram gives figures which show an average of about 1/16 in. for five years on standard LS-105-433), but this wear was all done under service, without the purchase of tools or equipment to wear out our rails for us.

The following proposition is undoubtedly true: If the extra cost of special steel, plus the extra cost of equipment for grinding, plus the labor cost of reducing corrugations in the special steel rail for a term of years representing the life of the old standard rail, is less than the cost of renewing the old standard rail at the end of that life, the new special steel is a paying proposition.

I doubt, however, that it is a paying proposition, for with noted and assumed wear as above for new and old composition steel rails, improved steel rails, under the most favorable conditions, would wear but twice as long as the older standard. I believe, moreover, that rail after grinding wears faster than rail not ground, and further, as most rails are renewed not because of "head wear" but from joint trouble, a rail otherwise with a life of twenty years would not remain in service for that period.

L. S. Sec. 105-433, mentioned in the article, shows a depth of groove to provide for 9/16-in. wear with ⅝-in. flange. This gives a life of nearly forty-nine years, from the rate of wear given, viz., 0.001 in. per month. Can we assume this rail would not be renewed for causes other than loss of section before this time had elapsed, and is it reasonable to assume that a rail wearing twice as fast would not be as economical? Either rail would doubtless be renewed before its life was gone, and then the cheaper rail would have as great a scrap value.

The author states that "corrugations appear on new grooved girder rails of the hardest composition." Do they also appear on softer rails? Yes, for he states that "corrugations also appear rather suddenly on old girder rails after they have been in service a number of years, etc.," and he gives as a reason for this sudden appearance "the old rails grow harder due to cold rolling." In other words, he states that we can get corrugations at once in new rails by making them as hard, or harder, than old rails cold rolled and we then have to grind them out.

It seems to me we are following too closely the practice of the steam roads which, due to increased speeds and wheel loads, need heavier and harder rails than formerly. Owing to increased weights and desired hardness of their sections, a better grade of steel is needed, in order that accidents from broken rails may not accompany the increases in speed and load. These reasons do not obtain for street railway needs. Our speeds have not increased, and our loads are in many instances lighter than formerly. We do not need a better grade of steel for, while a harder rail breaks more easily, we are not increasing the tendency to breakage and the occurrence of a broken rail in a paved street does not mean disaster. From this it appears that in following the action of the railroads without their necessity, we have brought evils to ourselves, in higher cost of steel and more rapid corrugation, both making higher maintenance costs without accompanying benefits.

For a comparison, I have made figures for cost of track and its maintenance, with the following assumptions:

Rail LS-105-433 old standard composition, not high in carbon, at $40 per ton, which is assumed to be the rail Mr. Cram states would corrugate in from one to two years. Again, assuming the same section, but increasing the carbon to give a much harder rail, at $42 per ton, to compare with the rail which corrugated in five months, as stated by Mr. Cram:

Term of years in track, ten.
Depth of wheel flange, ⅝ in.
Headway of cars, sixty per hour, eighteen hours per day.

Corrugations in low-carbon rail require complete grinding of track every two years.

The same operation will be required with high-carbon rail every six months. As the article states that the corrugations were equal in these two periods, this is a fair comparison.

Rail grinding can only be done six hours per day, as car headway is so frequent. For this period of grinding I have a price of 24 cents per foot of rail from rail actually ground.

Ordinary maintenance, 2½ cents per car-mile.

	Old Standard Rail	High Carbon Rail
165 tons of rail at $40	$6,600	.....
165 tons of rail at $42	.....	$6,930
Grinding every two years for eight years	12,672	.....
Grinding every six months for nine years and six months	.....	48,254
Cost of rail and grinding	$19,272	$55,184
Ten years' maintenance at 2½ cents per car-mile	91,880	91,880
Cost to renew rails and pavement, 1 mile at $5.75 per foot	30,360	.....
	$141,512	$147,064
Credit by scrap	1,500	.....
Total cost at end of ten years	$140,012	$147,064

With the old standard rail at the end of the period we have a reconstructed track and pavement and $7,000 saving as against the high-carbon rail, still in service with old track structure and pavement.

Let us assume again that, with the ⅝-in. flange, this rail section has a life of twenty years and is not renewed until then. At the end of this twenty-year period our old standard rail has cost us for grinding, maintenance and entire renewal of track and pavement, less scrap value of rail, giving us a reconstructed track and pavement, $244,564. The high-carbon rail has cost us $289,734 for the same period and is still in the track.

The high-carbon rail then has cost us $45,170 more than the old standard rail without the advantage of a complete renewal of track structure at the end of twenty years. This is approximately an annual expense of $2,250 more for the high-carbon rail.

The conclusions reached after reading Mr. Cram's comprehensive paper bear out what the writer has had in mind for some time, namely, that rails extremely high in carbon are not suitable for general street railway use, from the very causes that this paper brings out, viz.: rapid corrugation and its attendant effects on the pavement from the added vibration in the rails; expensive and increased grinding, and higher first cost of material.

The higher first cost would not be so great a factor, providing that it was accompanied by a longer life, but Mr. Cram conclusively proves that it does not.

This is the first paper I have seen which so clearly indicates a possible connection between corrugations and extreme rail hardness, giving information which shows the additional expense entailed by using steel of the specifications given.

Before changing our wheel treads and rail heads we should get information enough to satisfy ourselves that we will not bring into action still further tendencies toward higher maintenance and first costs. This information should also include any effect on tractive and braking efficiency, and should cover car operation as well as rail wear and corrugations.

As a matter of history, the writer has a report on what he believes to be the first rail corrugation in the country. This occurred in 1897 on what is now a part of the Rhode Island Company's lines. The rail was 9 in., 90 lb. tram girder, rolled by the Cambria Company and purchased through William Wharton, Jr. Out of about 10 miles of track laid between 1893 and 1896, one 30-ft. rail was found badly corrugated in 1897. Mr. Howe, then vice-president of the Wharton Company, was greatly interested, and as the writer was at that time in the engineering department of the Rhode Island Company he was familiar with the location and greatly interested also.

The rail was tested chemically and mechanically. Opinions were obtained from Messrs. Connett, Nichols, Lichter, Pratt, Weston and Bowen, and from the Pennsylvania Steel Company's experts. No test showed any difference in the steel in any part of the rail. Chipping, filing and drilling showed the rail to be the same as the average run of rails furnished, and the various fractures made to examine the texture showed a uniform quality of steel.

Chemical analysis of the steel taken from crest and hollow of corrugations showed as follows:

	Crest	Hollow
Si, per cent	0.045	0.046
Mn, per cent	0.816	0.823
P, per cent	0.077	0.076
C, per cent	0.411	0.412

The headway of cars over this rail was one and one-half minutes, one-way traffic. The opposite rail showed no corrugations. The paving was of granite block, not on concrete foundations, with sanded joints. The average speed was 6 m.p.h.

W. R. DUNHAM, JR.,
Engineer, Maintenance of Way.

Car Operation Efficiency

GENERAL ELECTRIC COMPANY

SCHENECTADY, N. Y., Jan. 22, 1916.

To the Editors:

I have read with much interest C. C. Chappelle's article in the issue of the ELECTRIC RAILWAY JOURNAL for Jan. 15, on the "Fundamental Principles of Car Operation Efficiency." I quite agree with his argument in favor of the maximum percentage of coasting practicable as an effective method of minimizing the power required for a given run, and that a record of the percentage coasting is a desirable and effective means of determining the relative operating efficiency of different motormen. The percentage values as illustrated by the curves are subject to variation due to condition of track and rolling stock, and I doubt whether results in practice will actually conform with his figures, as a coasting friction of 10 lb. per ton is lower than usually considered for service of the character illustrated, although modifications on this account would not detract from the general conclusions of the article.

Economy in power, however, is only one of the factors of successful operation. Attempting to secure minimum power possible through maximum obtainable coasting, with acceleration and braking to the limit of adhesion on the rail, would obviously be undesirable as causing discomfort to passengers and increased maintenance by reason of greater wear and tear. There are limits beyond which it will be found undesirable to reduce the power consumption, and it does not follow that the motorman showing the lowest power consumption is necessarily the best operator. Under such circumstances excessive acceleration and braking become as undesirable as the failure to profit by coasting is unnecessary. A proper application of the principles advocated by Mr. Chappelle should result in a marked reduction in the power used by unskillful motormen without in any way causing discomfort to passengers, or adding to maintenance of the equipment.

W. B. POTTER,
Engineer Railway and Traction Department.

Motor Buses in London

CROYDON CORPORATION TRAMWAYS

THORNTON HEATH, SURREY, Jan. 7, 1916.

To the Editors:

I have read with interest what you have published in regard to the jitney bus business and am pleased to have noticed in your journal, from time to time, that in many of the cities where the jitneys are being operated the authorities have passed regulatory ordinances. Neither the tramways in this country nor the street railways in America need have any fear of competition from the jitneys if the latter have to assume the same obligations as the former. But when this is not the case conditions are grossly unfair.

I am inclosing two statements which have a very great bearing on the unsatisfactory results of tramways operated in London and brought about by the now largely developed motor bus services. As will be seen, the figures relate to results for the financial year ended March 31, 1914. I did not compile similar statements for the year ended March last, as obviously, owing to the war conditions and the great shortage of tramway labor for several months during that year, all the London tramway systems were, more or less, adversely affected from these latter causes.

From Table I you will observe that nine out of the ten systems showed a total loss of £134,711, while one system only, that of Croyden, was able to show a small surplus. These unsatisfactory results were entirely due to the aggressive competition mentioned.

TABLE I—STATEMENT SHOWING DETAILS OF SURPLUS OR DEFICIT FOR THE YEAR ENDED MARCH 31, 1914, OF THE METROPOLITAN MUNICIPAL TRAMWAYS UNDERTAKINGS

Undertakings	Surplus	Per Cent to Capital	Deficit	Per Cent to Capital
Barking	.....	.....	£ 6,753	8.64
Bexley	.....	.....	911	0.92
Croydon	£1,361	0.48	.....	.....
East Ham	.....	.....	5,665	2.95
Erith	.....	.....	1,672	1.89
Ilford	.....	.....	3,567	2.4
Leyton	.....	.....	5,461	1.89
L.C.C	.....	.....	88,525	0.68
Walthamstow	.....	.....	7,735	4.10
West Ham	.....	.....	14,422	2.59
Totals	£1,361	.....	£134,711	.....

TABLE II—STATEMENT SHOWING CAPITAL EXPENDITURE; RATES AND TAXES; PERMANENT WAY REPAIRS; FOR THE YEAR ENDED MARCH 31, 1914, METROPOLITAN MUNICIPAL TRAMWAYS UNDERTAKINGS

			PERMANENT WAY REPAIRS				
Undertakings	Total Capital Expenditure	Rates and Taxes	From Reserve and Renewals Fund	From Revenue	Revenue Total	Reserve Fund Total	Per Cent to Capital
Barking	£78,140	£165	.....	£946	£1,111	.....	....
Bexley	98,408	502	£274	2,003	2,505	£942	0.96
Croydon	284,846	2,574	910	6,019	8,593	42,352	14.89
East Ham	191,654	2,467	.....	4,798	7,265	3,452	1.80
Erith	88,083	334	.....	1,465	1,799	.....	....
Ilford	149,573	710	603	1,332	2,042	2,294	1.5
Leyton	295,275	3,251	907	3,866	7,117	2,654	0.9
L.C.C	13,028,199	106,483	96,063	101,918	208,401	190,596	1.45
Walthamstow	188,192	611	.....	3,573	4,184	4,697	2.49
West Ham	566,878	7,073	4,532	17,503	24,576	32,740	5.89
Totals	£14,959,248	£124,170	£103,289	£143,423	£267,593	£279,618	1.87

Table II is equally interesting, for it shows the expenditure by the various systems in respect of rates and taxes—and here I might say that of the total of £106,483 paid by the London County Council, no less than £86,345 was in respect to rates on their tracks. No similar payment is made by the motor bus operators, nor do they pay anything toward the great wear and tear of the roads used and which such vehicles so largely

damage—in comparison with the payments made by the tramways.

The conditions are unfair in the extreme, and you express the matter very clearly when you say "that the jitney is a common carrier and as such should be subject to the obligations which other common carriers have to assume."

T. B. GOODYER,
Tramways Manager.

Delivery of Cars During 1916

THE NILES CAR & MANUFACTURING COMPANY

NILES, OHIO, Jan. 20, 1916.

To the Editors:

The car situation at present can be covered in the fewest possible words by the statement that any railways or manufacturers who are depending on *steel from the mills* for their cars probably will not receive them this year.

We are figuring 1 cent per pound premium for quick delivery on all steel wanted for cars to be used this summer, and the situation is getting worse. Any railways needing cars for summer service probably will be compelled to follow the same plan, namely: offer a bonus or premium for early delivery.

J. A. HANNA,
Sales Manager.

Express Cars in City Service

The Author Describes a Special Car Service that Has Been Inaugurated to Minimize the Peak Traffic from Large Factories

BY W. S. HAMILTON
Superintendent of Transportation Schenectady (N. Y.) Railway

IN the city of Schenectady a considerable part of the rush-hour traffic originates from the large plants of the General Electric Company and the American Locomotive Company, which are located not far from the center of the town. Almost all of the traffic is thrown upon the street railway within a few minutes after the closing hour of each plant, and in consequence a very difficult peak-load condition exists. However, the difficulties incident to this suddenly-applied load have been relieved to a large extent by the introduction of a limited or express service designed solely to take care of the factory workers whose homes are in the outlying sections of the city, and thus to relieve the congestion that would be inevitable under ordinary methods of operation. This innovation has been thoroughly successful in Schenectady, and it has met with very great popular approval since its introduction several months ago.

Under the scheme of operation of the limited service, one or two cars—depending upon the extent of the traffic—are assigned as express cars on each of the ten city lines and on each of the three interurban lines operated by the Schenectady Railway. These express cars are so placed in the schedule that they are the first cars to leave the loops at the factory entrances after the works close for the day. They are moved over a special route, used principally for the rush-hour service, between the factories and the part of the city where distribution of the cars to the various lines may be accomplished, and they are then run without stops to the outlying districts. As far as possible, these limited cars avoid the congested section of the city, and most of those on the various city lines make no stops at all until reaching outlying sections. On the interurban divisions they make their first stops usually at the city line. Runs of from 2 miles to 3 miles are made without stopping, and many of the factory employees are thus enabled to reach their homes in suburbs ten minutes, or more, sooner than they would under the old method of operation.

For its successful operation the whole scheme depends on the ability of all cars to run closely to schedule, expresses having the right-of-way. Prior to the rush hour the average headway of the normal service on the different lines is from ten minutes to fifteen minutes, but during the rush the headway for the regular cars is decreased by overlapping regular runs, thus reducing the intervals between cars to approximately five minutes on a number of the lines. This regular service at five-minute headway is operated from the factories for the balance of the rush hour after the express cars have been run out of the factory terminals, the twenty-five or more express cars being dispatched all at once and as closely together as is physically possible and the safety of operation will warrant.

The express service assists materially in relieving street congestion during the peak, and it has had a marked effect in eliminating the extreme crowding that originally occurred in the first cars to be run out of the factory terminus. The reason for this crowding was that, in accordance with the universal habit of the public, everyone attempted to get into the first car standing in line on the factory loop. With the express cars in operation, only those people who intend to ride to the outlying sections of the town board the first cars, which are in the limited service, and the consequent division of the crowd makes for a better distribution of the load in the different cars, thus simplifying the handling of the traffic.

The necessary gaps ahead of the express cars are automatically provided for by the fact that the service that exists before the rush hour begins is based upon a ten-minute or fifteen-minute headway. As the express cars are expected to make up about ten minutes in time, no extra long spacing of cars is required either before or behind the limited cars, these being followed promptly by local cars as soon as they leave the factory terminus. No difficulty whatever has been experienced in connection with the introduction of this limited-stop service. In fact, the express cars have been placed in operation on a number of the city lines at the request of patrons who had observed the saving in time that was effected on other lines where the service had been inaugurated.

Toledo Safety Committees Visit Out-of-Town Properties

Frank R. Coates, president of the Toledo Railway & Light Company, in his desire to broaden the work of the safety-first organization of his property, recently arranged four committees made up of trainmen to visit other properties and study safety-first methods. Four groups of four men each were chosen by popular vote among the men at the four carhouses on this road. From these sixteen men four committees were made up, each committee visiting one other city, and spending some time with the local officials and employees in studying safety first. F. C. Brown, the safety director of the Toledo Railway & Light Company, accompanied the committee which visited Indianapolis. On the return of the committee to Toledo reports of observations made were submitted to Mr. Coates.

The United States Department of Agriculture has issued a reprint of a discussion entitled "Wood Paving in the United States" by C. L. Hill, forest statistician. This paper discusses at some length the various problems of wood paving and shows the advantages of this type when treated with preservatives.

EQUIPMENT AND ITS MAINTENANCE

Short Descriptions of Labor, Mechanical and Electrical Practices in Every Department of Electric Railroading

Contributions from the Men in the Field Are Solicited and Will Be Paid for at Special Rates.

Portable Trolley-Wire Reel Holder

BY S. L. FOSTER
Chief Electrician United Railroads of San Francisco

The usual way to string out trolley wire where it cannot be done by a tower car is to use two wagons. The leading one carries the reel with its shaft mounted on supports and provided with a brake to regulate the rate of paying out the conductor. The following wagon, a tower wagon, carries the linemen who attach the trolley wire to the span by loose ties, etc.

The method in use on the United Railroads of San Francisco, where the standard is No. 00 round wire, eliminates the leading wagon altogether by drawing the trolley off the reel by the tower wagon. The reel is mounted on the portable reel holder shown in the illustrations. This device is provided with a brake and pole for use when it is trailed behind the tower wagon and for attaching it to any convenient anchorage when the location of the work is reached. If the location of the work is very far from the storeyard or up some steep grades, this loaded reel holder may be taken to and from the job on a flat car, the use of horses being thus avoided and the work expedited.

In the device shown, the shaft on which the reel is mounted is fixed in hinged clamps held by swing bolts provided with wing nuts, and is set slightly eccentric with the centers of the large wheels on which the device rolls. The result of this is that no special exertion is necessary in mounting a new reel of wire on the holder other than swinging the pole through an arc of 90 deg. The 46 to 1 leverage, provided by the 11.5-ft. pole as the long arm and the 3 in. of eccentricity of the reel shaft as the short arm of the lever, is such that one man can take out an empty reel and install a full one on the holder, although, as in handling the "one-man" automobile top, several men are better.

The compound lever foot-brake of the holder is arranged to impinge on the periphery of one reel flange, and is provided with means of adjusting it to different diameters of reels. The chains and split hooks holding the reel-shaft ends are for the preliminary lift of the reel from the ground to a timber to permit of easy application of grooved-shaft ends to corresponding thrust-bearing clamp surfaces. The pipe collars under the chains and the washers are to maintain the reel flange in exact line with the brakeshoe.

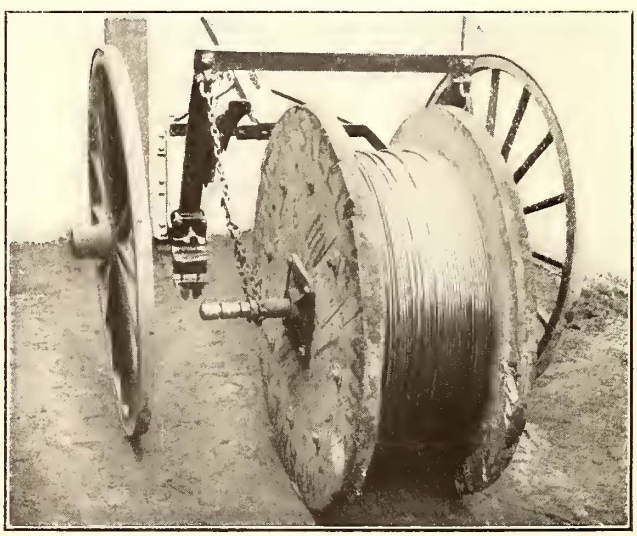
When the loaded reel holder reaches the site of the work it is fastened to a convenient side pole at the edge of the sidewalk by the ring in the end of its wagon pole, the trolley wire is put through a single-sheave pulley suspended from the first span wire so as to clear passing vehicles, the end is sent up to the linemen on the tower wagon and made fast, and the trolley stringing is ready to proceed down the street parallel with the track and as near as the passing cars will permit, the trolley wire being readily pulled out through the loose tie wires on the spans and through the rubber hose at crossings over or under other trolley wires.

When the new wire has been strung out and put in service and the old wire cut down, the reel in its holder is attached to the rear of the tower wagon, and is towed back to the storeyard.

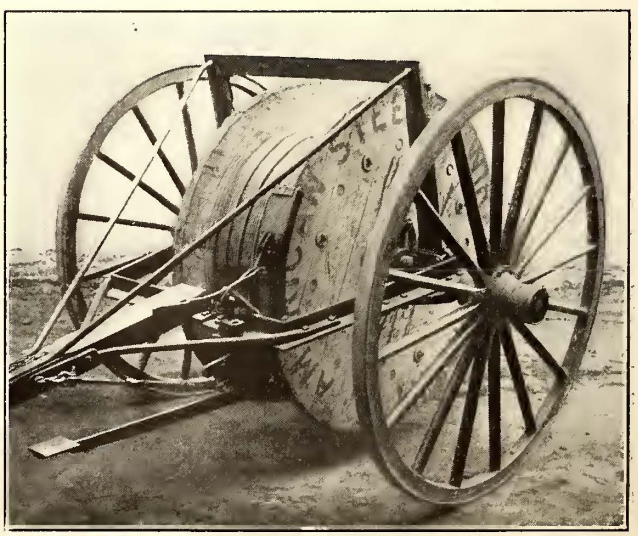
Of course, where the service permits, the trolley-wire stringing is done with a tower car, which carries a reel of wire on it so mounted that the conductor can be strung out in either direction.

The use of the device described reduces the labor required in loading and unloading reels, obviates the reserving of valuable storage room for the extra wagon, saves the necessity of providing for an extra pair of horses and a driver in case of wire renewal, saves the annual interest on the investment and the maintenance expense of the above, saves the cost for the day of their use either hauling the reel to or from the work or standing idly by waiting for the linemen to complete the work in hand before proceeding to another job, and shortens the actual time required for a given piece of work as compared with the old two-wagon method.

All these items are felt to be worth considering in



PORTABLE TROLLEY-WIRE REEL HOLDER—REEL READY TO LOAD



PORTABLE TROLLEY-WIRE REEL HOLDER—REEL IN PLACE

San Francisco, where the rates of interest and wages are higher than elsewhere.

The same idea might also be applied in stringing out other kinds of conductors, such as overhead feeders or underground cables.

If larger than No. 00 trolley wire is to be strung, or if extra long lengths can be put up producing a strain which might exceed the safe pull on the upper frame of the wagon, the reel holder can be trailed behind another vehicle preceding the tower wagon and all the benefits of the old two-wagon method of stringing be secured. This leading vehicle need be borrowed from some other job for but an hour or so, the emptied reel and holder being then left at the roadside to be towed back to the storeyard by the tower wagon at the end of the day. This, however, has never been done here. In San Francisco, with the many railway curves, grades and intersecting lines, it is seldom in the urban districts that a full mile reel can be strung out continuously or is justified by the wear found on the old trolley wire.

Our standard Trenton tower wagon has always proved amply strong for pulling a mile reel of No. 00 wire out from the anchored reel.

Equipment Defects—Controller Connection Boards, Frames and Covers

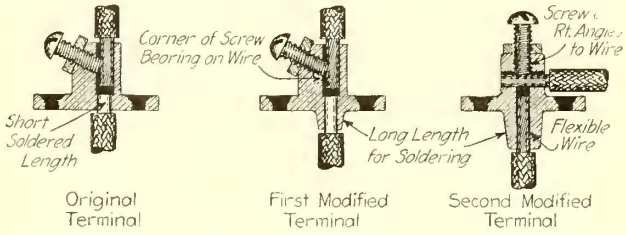
BY C. W. SQUIER, E.E.

Terminals and connection boards in controllers are provided so that the wires running outside the controller can be quickly connected and easily disconnected, thus making the removal of the controllers from cars as easy a matter as possible. They also provide a means for making the connections to the contact fingers in a permanent and stable manner. The most common forms consist of wooden boards located at the bottom or side of the controller on which binding posts of some form are mounted. The front sides of these are usually arranged to receive the wires coming from the motors and grid resistors, while into the backs are soldered the leads running to the finger bases. Cutout switches for cutting out disabled motors are also usually mounted on the connection boards.

The principal troubles experienced with connection boards and terminals are short-circuits or grounds caused by accumulation of dirt or by loose connections. The keeping of the boards and terminals clean is a matter of careful inspection only, and this source of trouble can be entirely eliminated by blowing out the controllers with compressed air and wiping off the accessible parts on each inspection.

Some changes in terminals which have brought about a reduction of the troubles caused by leads breaking or becoming unsoldered, are shown in three accompanying illustrations. The first of these shows a section of the original terminals as received with the controllers. In these the length of wire soldered into the bottom is barely 3/16 in. This length proved to be insufficient. The original terminals also had the screws for fastening the top leads inserted at an angle so that the corner of the screw pressed against the wire on a sharp edge which soon cut the strands away at the point of contact. Vibration then caused a loose connection at this point. In the second illustration, the terminal is shown lengthened so that the amount of surface provided for soldering in the leads is increased to 7/16 in. This effectively prevented the loosening of the connections. The next change was to do away with the angular bearing clamping screw on the wire. This was accomplished by inserting the screw at the top where the wire originally entered, and by drilling a new hole for the wire at right angles to this. The third illustration shows this change and also the provision of increased length for soldering the wire at the bottom.

Flexible or stranded wire was also used throughout, as it was found that vibration caused solid wire to break very soon, in case a crack was started by bending. The

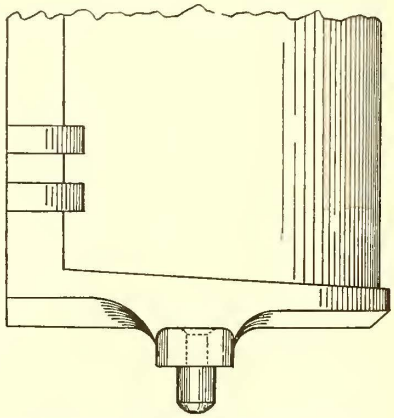


EQUIPMENT DEFECTS—IMPROVEMENTS IN CONTROLLER TERMINALS

use of flexible wire permits bending without danger of cracking and also provides a rough surface to hold the solder where it is inserted in the terminal. By having the hole for the bottom lead and the screw in the same line, this hole can be drilled with one operation, and it then remains only to tap out the upper part to receive the screw.

In some of the later types of controllers the connection boards have been done away with entirely, the outside leads running directly to the finger bases. This plan provides more room in the controller for other details and perhaps reduces the size of the controller for the same capacity slightly. It also eliminates the danger of short-circuits at connection-board terminals. The outside leads, however, are necessarily much longer and more difficult to handle while controller replacements or removals are being made. These leads are also much more liable to injury, as the arrangement of the leads is left to the man making the replacement, and as permanent a job of control wiring cannot be obtained. As the leads are not supported, their vibration with car movement is much more severe and the danger of their becoming loose at the finger-base terminals is consequently increased.

On roads which change their controllers from closed to open cars in the spring and back again in the fall, in addition to the necessary removal of controllers for overhauling, the ease with which a controller can be connected and disconnected becomes an important one.



EQUIPMENT DEFECTS—PIN RIVETED IN CONTROLLER FRAME FOOT

As the controller frame is intended primarily only for supporting and housing the other controller parts, there is very little that can happen to it other than for it to become broken. Where the feet of the frame are bolted down solidly to the car platform, it usually happens that if a car is in collision so as to bend in or break the front, the controller frame is also broken, or the feet at least are broken off. Some of these breakages can be prevented if the controller is so supported that it will bend over with the dash and is not bolted solidly to the platform. An accompanying illustration shows a method of riveting pins into the controller feet, these in turn to set into holes in the car platform so that they will

serve to keep the controller from moving and still not hold it rigidly on the floor. This mounting will permit the controller when fastened to the dash in the usual manner to pivot about the feet in case the dash is bent over without danger of damaging the frame.

The controller cover is another part that should be kept in such condition that it can be quickly and easily opened. As motor cutout switches in most cases are located inside the controller, if it is necessary to cut out a motor on the road the motorman must open the cover, and this in most cases without the use of any tools. Special attention must then be given to covers and to the cover clamping screws and nuts. Covers must set properly in place and be securely fastened. The clamping screws must be straight, threads in good condition and not burred, and the nuts must turn on and off by hand.

The most satisfactory location for the cutout switches is near the motor, one near each, and within easy access from the side of the car instead of inside the controllers. This arrangement permits the motorman to be sure as to which motor he is cutting out, for he can throw the switch near the particular motor which is giving trouble. This method has been in use on one road for nearly ten years and has proved entirely satisfactory.

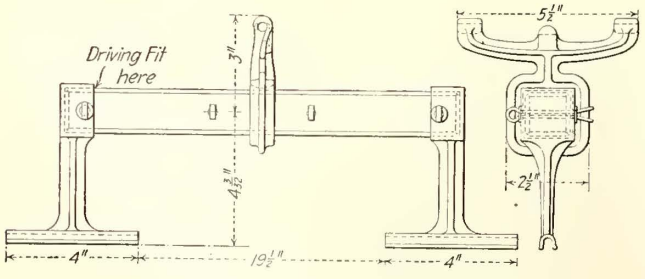
With the cutout switches located inside the controller it is necessary to throw them in the controllers at both ends of the car to properly cut out a motor. The usual procedure is to cut out a motor and then try the car. If the circuit breaker does not blow it is assumed that the proper motor has been cut out. It often happens, however, that the motorman operates with the defective motor in circuit and cuts out the good one.

Overhead Construction on the Twin City Lines

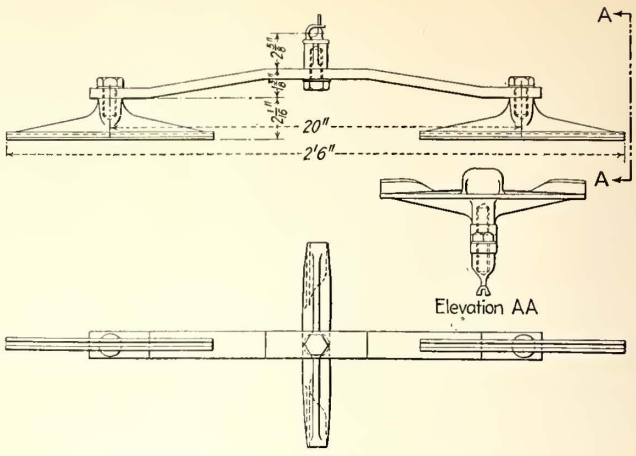
BY J. C. VINCENT
Assistant Engineer Twin City Rapid Transit Company, Minneapolis, Minn.

As is well known, the operating companies composing the Twin City Lines were pioneers in street railway electrification, having started in 1889. Because of this fact and also because the Twin City Lines have extensive shops, the overhead construction in use has been developed along original lines and was manufactured in the railway shops.

The construction in general consists of steel side poles with span wires supporting the trolley wires. In this construction the main idea has been to keep it as light as possible, and at the same time to eliminate hard spots. As the life of trolley wire is determined by the wear at the hangers and special work, the overhead construction has been designed for light and smooth underrunning so as to eliminate pounding on the wire. This article will be devoted to descriptions of the trolley hanger, the sub-feed hanger, the pull-over, the pole top, and a crimping tool used in attaching the hangers to the Fig. 8 wire.



TWIN CITY OVERHEAD—STANDARD HANGER



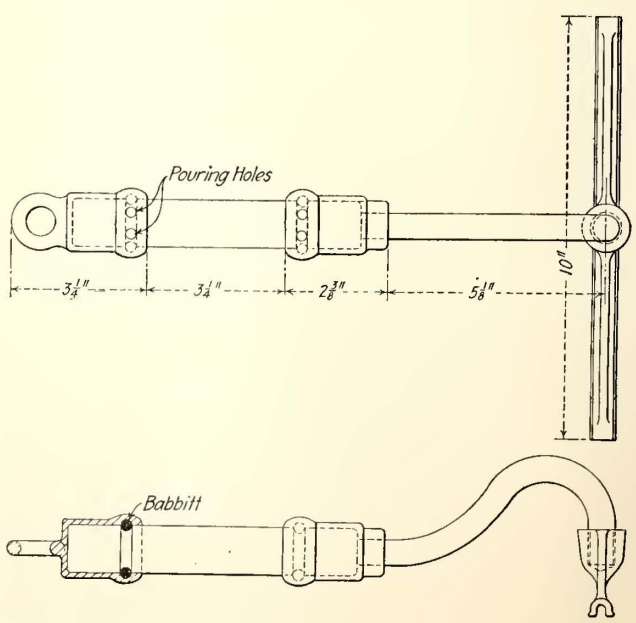
TWIN CITY OVERHEAD—SUB-FEED HANGER

As shown in an accompanying illustration, the trolley hanger consists of two legs attached to the ends of a 2-ft. maple stick, at the center of which there is a sister hook for span-wire attachment. The legs are of bronze, with a 4-in. ear on the bottom of each and a square fitting on the top with provision for pinning to the maple stick by means of a cotter pin.

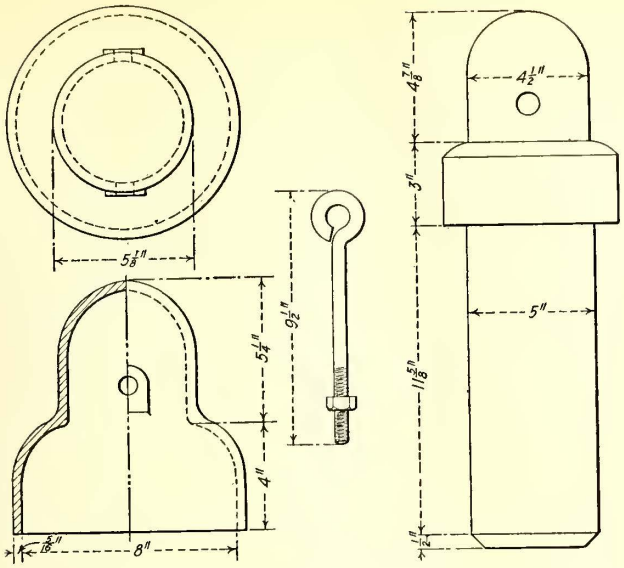
The maple stick is 24 in. long, 1⅜ in. square, with the corners chamfered, and it is thoroughly impregnated with paraffin by boiling. Formerly a somewhat shorter stick was used but it has been found that the use of the longer stick results in more uniform wear, that under the leg being now not noticeably greater than in the middle of the span. The sister hook is of malleable iron, with the top arranged for hooking over the span wire and with a square eye below through which the maple stick slips loosely. The hook is held near the center of the stick by means of two cotter pins.

This construction is light and, as the points of support are not directly below the span wire, the trolley wire rocks slightly as the wheel passes under the hanger and no pounding results.

The sub-feed hanger is similar in general principle to the hanger just described, as far as the provision of flexibility is concerned. It consists of two ears of the usual design carried at the end of a light channel iron with center raised about 1⅜ in. above the ends. At the center this channel iron is bolted to a galvanized mal-



TWIN CITY OVERHEAD—PULLOVER WITH WOOD STRAIN INSULATOR



TWIN CITY OVERHEAD—STANDARD POLE PLUG AND CAP

leable iron hanger for attachment to the span wire. This arrangement gives the desired flexibility and also doubles the current-carrying capacity.

The pull-over consists of a clamp, a gooseneck, and a wood-strain insulator. The wood-strain insulator is used here, as elsewhere in the system, because the composition insulator does not give satisfaction on account of lightning puncturing the insulating material. The clamp is of bronze, and is made with a 10-in. ear. The gooseneck is of ⅝-in. wrought-iron rod bent to the form shown in one of the illustrations, and threaded on both ends.

The wood-strain insulator consists of a cylindrical piece of hard maple, 6¾ in. long and 1⅛ in. in diameter, thoroughly impregnated with paraffin. Near each end is a semicircular groove. On each end of the metal rod is a malleable-iron casting provided with eye, hook or nut, as required. The clamps are fastened to the rod by means of babbitt metal poured into the groove in the rod and into a corresponding groove in the casting. With this design of pull-over there is no heavy weight directly over the wire.

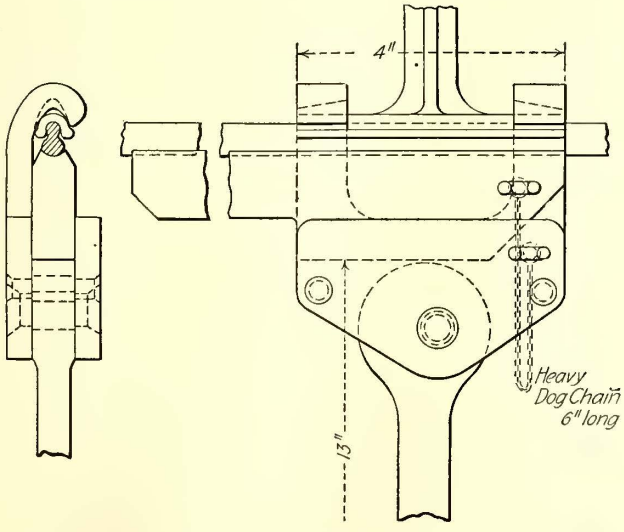
All other special work, such as switches and crosses, is made straight underrunning, of tough bronze, and of as light weight as possible.

The trolley wire adopted as standard by the company is No. 00 hard-drawn copper. This wire allows a firm fastening to the hangers and pull-overs, is easily installed, and is of a size sufficient to carry the current, as it is supplemented by feeders, mostly underground, where necessary. The type of hanger used does not allow the wire to lie flat and it overcomes the objection usually made to Fig. 8 wire. The wire used at present is given an extra pass through the dies, thus furnishing greater tensile strength and hardness and consequently yielding greater life. The choice of No. 00 Fig. 8 trolley wire was determined by our experience with this size and the No. 000 wire.

The span wire used is made up of three strands of No. 11 galvanized steel wire, the light weight supported and the large sags allowed in the span wire, 3 ft. to 4 ft. safely permitting the use of this size of wire. The large sag in the span wire conduces to the flexibility of the construction in both the vertical and horizontal directions.

We use a side pole made of 7-in., 6-in. and 5-in. standard pipe, with 8-in. standard pipe for the ground sleeves. In the top of the pole a pine plug 20 in. long is inserted, this having the form shown in one of the illustrations. Over the plug is placed a cast-iron cap and the span wire is attached to a wrought eye-bolt which passes through cap and plug.

The company has developed a crimping tool for use in attaching the trolley wire to the hangers, and this has given very good satisfaction. The details are shown herewith. The device consists of a double hook which is designed to force the trolley wire firmly into the groove in the ears, the swaging being done with a block and hammer. It is drawn down by means of cam and lever which forces a long anvil against the lower surface of the trolley wire. The anvil is attached to the remainder of the device by means of a chain so that the whole may be kept together.

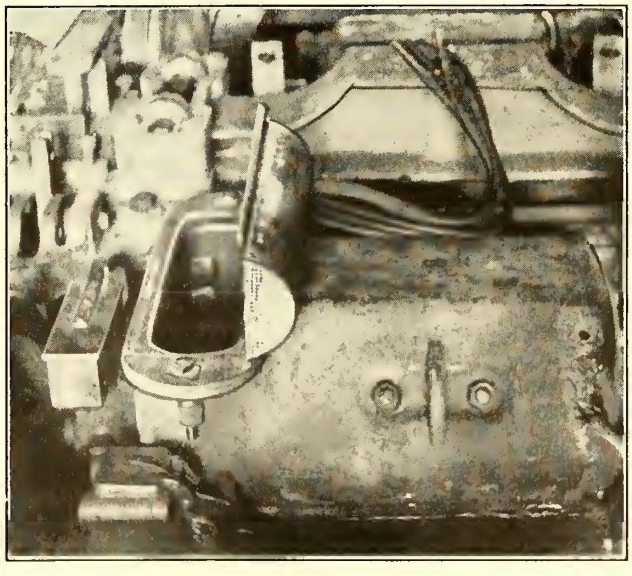


TWIN CITY OVERHEAD—TROLLEY CAR CRIMPING TOOL

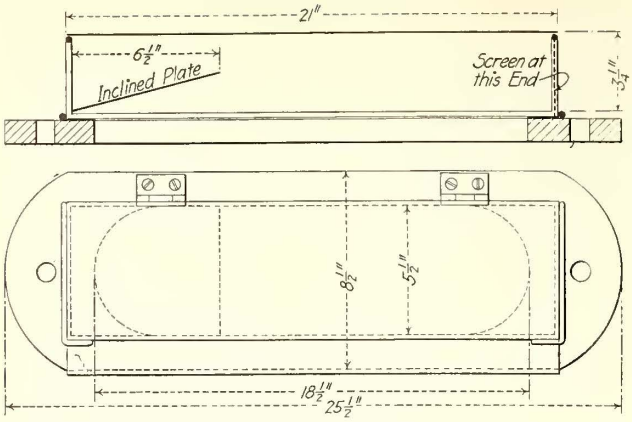
Semi-Ventilation of GE-57 Motors

BY R. W. PALMER
Manager Cleveland & Erie Railway, Girard, Pa.

In order to increase the service capacity of the GE-57 railway motors and reduce the temperature of the windings, the Cleveland & Erie Railway has replaced the solid iron covers over the commutators of motors of this type with wood covers having their centers cut out. The open spaces have galvanized-iron covers or hoods, as shown in the accompanying illustrations. Inasmuch



HINGED VENTILATED COVER OVER COMMUTATOR OPENING



DETAILS OF GALVANIZED-IRON VENTILATING COVER

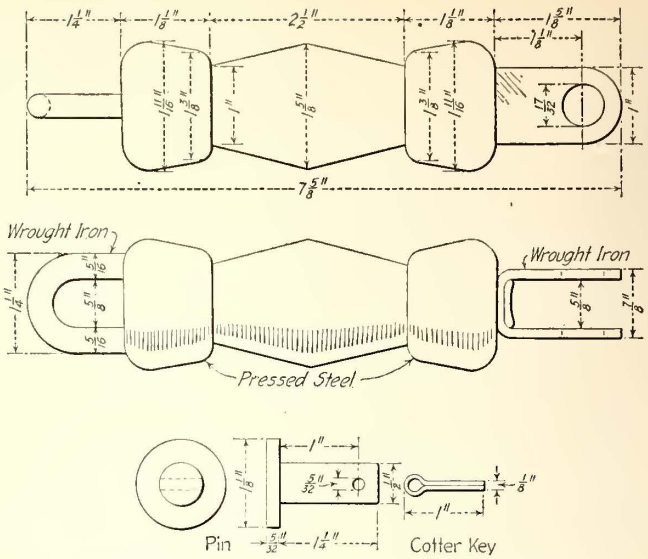
as the cars on this road are equipped for single-end operation the galvanized-iron covers are made right and left-hand. When they are mounted on the motors the ends without the screen are placed toward the front to allow free circulation of air. The inclined plate shown in the drawing acts as a shield to prevent wheel splash entering the motors, the screen on the other end preventing small stones and other foreign substances from entering. The handhole plates or covers under the commutator, as well as the top and bottom plates on the pinion end, are also replaced with screens so as to allow the free circulation of air within the motor frame.

This arrangement has been used with considerable success by the company during the past season. Four of the above two-turn motors, having a gear ratio of 25:59 mounted on Baldwin, Class 78-22-A trucks, have been used under cars weighing 28 tons. In the winter, on account of possible trouble from snow, the standard covers may be replaced, as due to a lower temperature of the surrounding air the windings will not exceed a safe temperature. However, in operating cars through a recent severe snowstorm the GE-57 motors with ventilated covers, as well as the 306-V motors, were free from snow and comparatively dry on the inside.

Swiss Electrification Prospects Revived

The problem regarding the proposed electrification of the Swiss State Railways is beginning to assume a more definite stage, according to foreign reports. Early in December an important conference was held at Berne, at the instance of the Swiss Association for the Regulation of Water Powers and the Association of Electrical Engineers, to discuss the question of electrification. M. Thormann, the engineer who was in charge of electrifying the Lötschberg Railway, delivered a lecture on the various systems of electric operation, and proposed the adoption of the single-phase type, which has given great satisfaction on the Lötschberg Railway. A resolution was passed expressing the hope of the electrification of the St. Gothard Railway together with the approach line to the Simplon Railway, the conference being convinced of the advantages which result from better utilization of the existing water powers by assisting in rendering the country independent, from an economic point of view, in regard to supplies of coal for railway operation.

The Chicago, Ottawa & Peoria Railway made a record during 1915 of having trains on time. With 25,587 scheduled trains operated during the year, 24,162 of these, or 94.5 per cent, were on time.



DETAILS OF B. R. T. WOOD-STRAIN INSULATORS

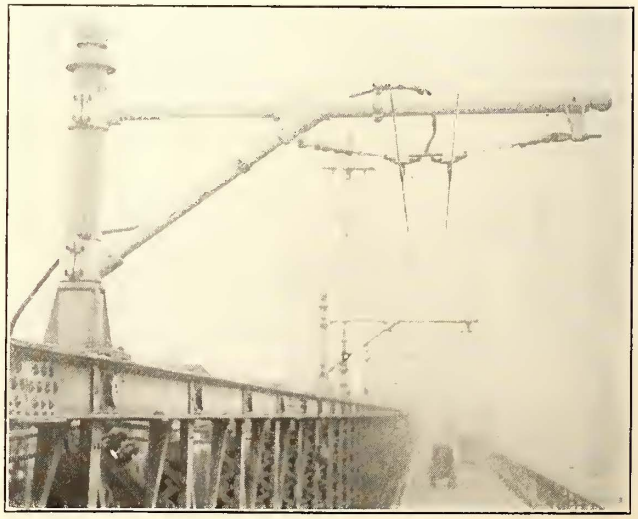
Wood-Strain Insulators for Brooklyn

The Brooklyn (N. Y.) Rapid Transit Company recently installed on its lines some 2½-in. wood-strain insulators in place of 2½-in. globe-strain insulators. The specifications for these insulators are the same as for the 5-in. wood-strain insulators except that the test for the smaller insulator is 2000 lb., whereas for the 5-in. size it is 4000 lb.

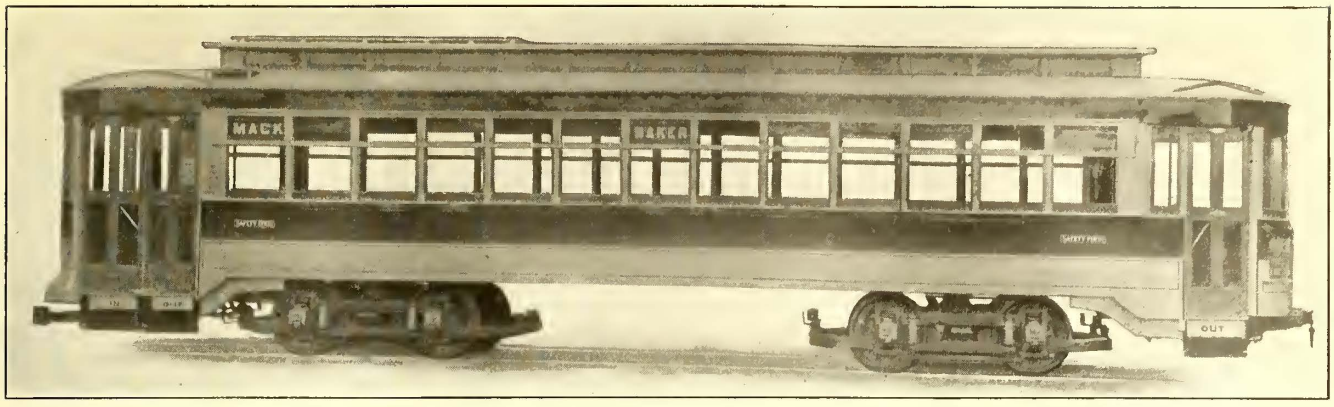
These new insulators are made from second growth, split hickory. The wood is thoroughly seasoned and straight-grained and so treated as thoroughly to fill all of the pores with oil. As a finish, it receives two coats of clear varnish.

Steel caps are used, compressed tightly on the ends of the wood so as to prevent any moisture working in between the cap and the wood but not so tightly as to injure the fiber of the wood. The iron is protected against rust either by a heavy galvanized coating or by being sherardized. The eyes in the caps are placed at right angles to each other.

All insulators were inspected upon delivery to the storeroom. The inspector first carefully examined each insulator for any defects. Each insulator was then tested by having a tensile stress of 2000 lb. applied to it. The company is now considering the advisability of substituting the wood type of insulator for frog pull-offs also.



B. R. T. WOOD-STRAIN INSULATORS ON BROOKLYN BRIDGE



DOOR SIDE OF DETROIT SINGLE-END CAR

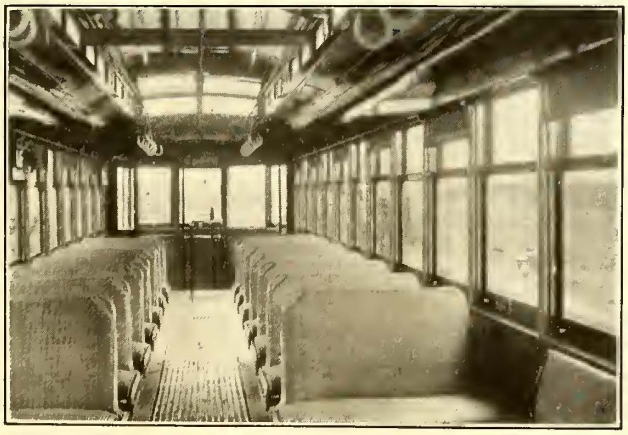
Detroit Single-End Motor Cars

The Detroit (Mich.) United Railway's fifty new center-entrance trail cars were described in an illustrated article by C. L. Keller, master mechanic of this company, in the ELECTRIC RAILWAY JOURNAL of Dec. 4, 1915. This railway company has also had built by the G. C. Kuhlman Car Company twenty-five new all-steel prepayment motor cars, which are shown in the accompanying illustrations. Although the motor car bodies have the same monitor deck type of roof as the trailers and contain practically the same interior specialty equipment, they differ from the trailers in being of the end-entrance type, while the trailers are center-entrance. As they are operated from one end only, the doors of the motor cars are located only on one side of the vestibules, the rear platform being equipped with double folding doors and steps for entrance and exit and the front platform with a single folding exit door. The bodies are without platform bulkheads. The motor cars also differ from the trailers in having a cross-seat arrangement for forty-six passengers, while the others have longitudinal seats for fifty-seven passengers.

The general dimensions of the motor cars are as follows:

Length over vestibule	46 ft. 10 in.
Length of body	33 ft. 4 in.
Width over sills	8 ft. 1 13/16 in.
Width over all	8 ft. 4 1/4 in.
Bolster centers	21 ft. 2 in.
Height, rail to sills	2 ft. 9 3/8 in.
Height, sill to trolley base	9 ft. 3 1/4 in.
Weight of car body, including seats	16,800 lb.

Among other items of equipment are the following: GE-203 motors, outside-hung "Golden Glow" headlights, Detroit standard pedal sanders and Brill "Dedenda" gongs.



INTERIOR VIEW OF DETROIT SINGLE-END CAR

Packing Ring Practice of the Rhode Island Company

Nearly one-third of the air compressors on the 813 air-brake cars of the Rhode Island Company, Providence, R. I., are equipped with McQuay-Norris piston packing rings. These rings have been substituted for the old type three-part rings, either as renewals or when rebushing cylinders. They are tested at 80 lb. pressure and are somewhat tighter than the old three-part rings. They are of hard, close-grain and fairly brittle cast iron, such as has been found desirable for this service. All rings are 5/32 in. thick except those of the Westinghouse D-1-E compressors. Compressors are overhauled at least every two years and oftener if occasion demands.

The later type of compressors have pistons fitted with three snap rings. When compressors are rebushed, the inside diameter of a 5-in. cylinder is about 1/64 in. scant, which allows truing up of the piston; on the second rebushing the inside diameter is 1/32 in. scant to allow a second truing up of the piston. Not more than two rebushings are advisable, using old pistons.

Growth of Electric Railways

In a paper recently prepared for the Institution of Civil Engineers in England by Henry Metcalf Hobart, now of the General Electric Company, Schenectady, N. Y., statistical tables were cited to show the rapidly increasing extent to which electricity has been employed as a motive power for trains. The rate at which the electrification of sections of American steam railroads has grown since 1895 was shown as follows:

Electrically-equipped single-track mileage of steam railroads in the United States and Canada—1895, 8; 1900, 51; 1905, 215; 1910, 1580; 1915, 3460; total single-track mileage of steam railroads in the United States and Canada—1895, 233,000; 1900, 259,000; 1905, 307,000; 1910, 352,000; 1915, 380,000; percentage of electrically-equipped single-track mileage—1910, 0.45; 1915, 0.91.

The above figures, however, it was explained, did not indicate the growth of the electric railway industry in America. The greatest activity has heretofore related chiefly to independent electric railway properties not necessarily involving train operation. The rapid growth of this business in America is indicated by the statistics below, the totals being given in round amounts:

Total single-track mileage of electric railways in the United States and Canada—1890, 1260; 1895, 12,100; 1900, 19,300; 1905, 32,500; 1910, 40,000; 1915, 45,000; total number of motor cars—1890, 5600; 1895, 26,000; 1900, 43,600; 1905, 64,000; 1910, 89,600; 1915, 100,000.

NEWS OF ELECTRIC RAILWAYS

WASHINGTON COMMISSION WORK REVIEWED

Chairman Reynolds Discusses Activities of That Body for Year Just Ended

Charles A. Reynolds, chairman of the Public Service Commission for the State of Washington, in discussing the work of that body for the year ended Dec. 31, 1915, was quoted in part as follows:

"The accomplishments of the Public Service Commission during the last year may be treated under five separate headings:

" 'The elimination of the utility factor in valuation.

" 'The segregation of property owned by the same utility for purposes of valuation.

" 'The elimination of the telephone deposit.

" 'Improved street car service.

" 'The reduction of the cost of electrical energy for residential lighting and irrigation purposes.'

"Up to the last year the so-called utility factor was used by the Public Service Commission of Washington in the valuation of rights-of-way and other real estate owned by public utilities.

"By the utility factor is meant the multiple used by the engineer after determining the value of a piece of real estate by comparing it with the value of contiguous property. The engineer multiplies that value by two or three, or some other multiple, upon the theory that it cost the company two or three times as much to buy it as it would cost a private individual, even though in fact the land was donated to the utility in the first instance.

"Up to the time of our decision in the Seattle, Renton & Southern Railway case the utility factor was used by the Public Service Commission of Washington in the valuation of rights-of-way and other real estate used by public utilities.

In passing upon the various question which were raised in the Seattle, Renton & Southern Railway case this commission said:

" 'If the rule formerly followed by this commission is incorrect it invalidates every valuation ascertained by the commission where the multiple is used. Shippers and passengers are now paying interest upon millions of dollars that have no existence outside of the imagination or arbitrary notion of a so-called expert. The matter is of so far-reaching importance, both to the railway company and to its patrons, that we deem it proper to set forth at length the reason for the rule as expressed by Justice Hughes of the Supreme Court of the United States.'

"Thereafter the members of the commission at a meeting of the National Association of Public Service Commissioners in Washington, introduced a resolution to the effect that no utility factor should be used in the valuation of real estate. This motion was carried by the National Association unanimously and since that time no utility factor has been used."

Discussing segregation of properties, Chairman Reynolds said:

"Certain corporations in the State of Washington own and operate utilities of different kinds, such as light, water, gas and street railway, in different portions of the State. These corporations desired the Public Service Commission to value their entire property as one property, regardless of their nature or place, or places, of operation. The statute recognizes this right to request segregation, and it seems only right that it should be granted out of common justice.

"In street railway matters the commission met with considerable opposition until the United States District Court held that its right to order adequate and sufficient service was absolute. The commission has maintained that the rendering of service is the duty of a public utility irrespective of returns, and it is on this theory that we have based our acts."

TRANSIT DIRECTOR TAYLOR REPORTS

Head of Department of City Transit of Philadelphia Reviews Rapid Transit Situation There

The annual report of the department of city transit of Philadelphia, Pa., for the year 1915 has been completed by A. Merritt Taylor, the retiring transit director. The report will contain a detailed summary of the activities of the department during the year just ended; the present status of the two high-speed projects now in course of construction; the estimated cost, routes and plans of the additional subway and elevated lines recommended by the transit department; the financial aspects of the entire transit project; the enabling legislation, both Councilmanic and State, passed during the year, and finally a review of the tentative agreement between the city and the Philadelphia Rapid Transit Company, looking to the operation of the city-built high-speed system and to the establishment of universal 5-cent fares in place of the present 8-cent exchange tickets.

The report will lay particular stress upon the necessity for the State Legislature to pass a bill, prepared last spring by Director Taylor, providing that cars should be through routed between lines built and owned by cities of the first class and lines built and owned by corporations within cities of the first class.

Prompt action by all parties to ratify or amend the present tentative agreement between the city and the company in order to insure the abolition of the 8-cent exchange tickets and Philadelphia Rapid Transit operation of the lines will be particularly urged in the report. In this connection two suggestions toward the amendment of the present tentative agreement will be made on the basis of recognition by the city of cash actually paid in on the stock of the Union Traction and Philadelphia Rapid Transit Companies.

The suggestions will be, first, that the preferential payments by the city to the Philadelphia Rapid Transit Company, as provided in the tentative agreement, to protect the transit company against losses due to diversion of traffic from the present to the new lines, be based upon actual investments by the stockholders of the transit company and the Union Traction Company, and second, that provision be made for the investment by the Union Traction stockholders of the balance still owing to make up their full capitalization.

Under the estimates of Director Taylor, it will cost between $15,000,000 and $16,000,000 to equip for operation the city-built elevated and subway lines. Under the tentative agreement whereby the Philadelphia Rapid Transit Company would become the operating company, this cost of equipment could be met through the payment of $19,500,000 by the Union Traction stockholders. For this reason particular emphasis will be laid on the need for this provision in the report.

The suggestions, in effect, would give a 6 per cent cumulative return to the stockholders of both companies on the cash actually paid in since 1895, the time of reconstruction. The compensation for the abolition of exchange tickets would be increased, but this increase would be offset by reductions in the preferential payments to the company. The preferential payments would be in amount necessary to make the net income of the company each year equal to $2,430,000, or 6 per cent on $10,500,000 Union Traction stock (paid in) and on approximately $30,000,000 Philadelphia Rapid Transit stock (paid in). The obligation of the city, however, would under no circumstances be more than $600,000 a year, collected only from the operation of the city-built lines.

The report will contain a completely revised estimate of the cost of construction of the lines now under way and those recommended. The revision is based upon the savings made in contracts already let, and it will also include 20 per cent added to cover cost of engineering, interest and required sinking fund payments.

DES MOINES ELECTION VALID

Supreme Court of Iowa Upholds Vote of Franchise to Des Moines City Railway. Rehabilitation Under Way

Immediate acceptance of the new franchise is announced by Emil G. Schmidt, president of the Des Moines (Iowa) City Railway, following the decision on Jan. 22 of the State Supreme Court that the recent franchise election was valid. Mr. Schmidt said on Jan. 24 that before the week was over Des Moines patrons would be enjoying the new rate of six fares for a quarter, as provided in the new franchise. Mr. Schmidt will hasten to secure from the Federal court the discharge of the company from the receivership into which it was thrown prior to the voting of the new franchise.

The financial reorganization of the company has been delayed only to await the decision of the high court on the franchise election. The date for the acceptance of the franchise expires on Jan. 28, and though the franchise may be accepted without the prior discharge of the company from the receivership the plans of Mr. Schmidt call for the operation of the system under all the regulations of the franchise immediately upon the acceptance of the new grant. For that reason the discharge from receivership is to be secured prior to the acceptance of the grant if possible. To the representative of the ELECTRIC RAILWAY JOURNAL in Des Moines Mr. Schmidt said:

"Dirt will be flying on our improvements for the year, to cost $1,500,000, within a week or two, and next week I expect to close up all of the business of the company pertaining to its financial reorganization. I shall then immediately start plans for the entire rebuilding of the system in the downtown district and construction work on that improvement will start as soon as the weather permits. Contracts will then be let for improvements more distant from the heart of the city, and with warmer weather the people who voted for the franchise will see that we intend to keep our pre-election promises."

A large demand is expected for the six-for-a-quarter tickets with consequent temporary effect on the gross receipts of the company.

The opinion of the Supreme Court holding the election to be valid was written by Justice Preston. Justices Deemer, Evans and Salinger dissented.

NATIONAL CIVIC FEDERATION MEETS

At the sixteenth annual meeting of the National Civic Federation, held in Washington on Jan. 17 and 18, the main subjects were preparedness for national defense and immigration. Many other topics, however, were taken through various committee reports showing constructive work that the federation is doing along various industrial and public lines. One official action was taken when the federation adopted resolutions to be sent to the President and Congress, urging enactment of some plan for pensions for superannuated or disabled federal employees.

Louis A. Coolidge, chairman of the welfare department, said in connection with the subject of profit sharing that organized labor is opposed to the system on the ground that it deprives the worker of his organized bargaining power, and also that employers question it because workers fail to understand its benefits and to take intelligent advantage of them. On the whole, he spoke in favor of the principle as far as it has been tried, but he argued that betterment experiments should not be based on charity but must justify themselves in dividends.

The delegates received advance copies of the introduction to the report on profit-sharing plans soon to be issued. The federation has made an extensive investigation and analysis of more than 200 plans in the United States, and the report will endeavor to show impartially all the important details of the various plans, with the claims made for them and the objections urged against them. No attempt will be made, however, to decide the conflicting claims or to weigh the relative importance of the advantages or disadvantages of profit sharing.

Louis B. Schram, chairman of the national committee for the prevention of industrial accidents, urged that accidents be classified by causes in order better to understand conditions, and that safety devices be required on machines as integral parts when they are made in the factory. The workmen's compensation department reported in regard to the growth of the compensation movement in the United States, while the social insurance department advocated a system of voluntary rather than compulsory social insurance in America. The pension department compared the various systems under federal, state, municipal and industrial employment and supported the idea of federal pensions.

A plea for the support of the federation in the fight for uniform court procedure in all states was made by the chairman of the uniform law committee of the American Bar Association. The national welfare survey committee reported as to the increase in the voluntary improvement of conditions for employees, and particularly of citizenship and trade education for foreigners. Other reports described the progress which has been brought about in industrial hygiene and labor conditions during the period covered by the last thirty years.

COMMISSIONER WOOD INDICTED—INQUIRY TO CONTINUE

Robert Colgate Wood, who resigned as a member of the Public Service Commission for the First District of New York just before charges alleging corruption in office were made against him by the Thompson legislative investigating committee, was indicted on Jan. 25 by the Grand Jury on a charge of soliciting a bribe. He surrendered himself to District Attorney Swann and was arraigned before Judge Mulqueen in the Court of General Sessions. Through his attorney, he pleaded "not guilty," and asked for one week in which to change his plea or make necessary motion. Assistant District Attorney O'Malley asked that bail be fixed at $7,500, and arrangements were made to have the money put up by a surety company. It is expected that Mr. Wood will be brought to trial in February.

An interesting political drama has been enacted in New York in connection with the legislative investigation of the Public Service Commissions. Not content with the scope of its original work the committee began to proceed along other lines. The chairman of the committee sought additional funds and announced that the investigation would continue. The Speaker of the House thought that the committee had done enough investigating and said so. The chairman of the committee promptly announced his dissent. At this point some one drew across the trail of the committee the red herring of expenses incurred by the members for hotel accommodations and entertainment in New York City. An investigation of the investigators was then proposed. Just about this time some one else as a sort of counter irritant, suggested that the inquiry be widened to include the expenses of Governor Whitman on his recent trip to the Pacific Coast. Thereupon an assemblyman said that a Governor ought to be beyond suspicion. On Jan. 25 came capitulation. It was announced that the milk-white flag of surrender had been hoisted over the Speaker's desk in the Assembly; that the Thompson committee investigation would continue to March 7 with an additional appropriation of $30,000, and that it had been determined to squelch the resolution providing for an omnibus investigation of all bills of legislative investigating committees, including the Whitman junket to the Panama-Pacific exposition. In the wake of all this the following picture of political harmony at Albany was painted by one of the correspondents at the capital:

"There never has been such unanimity between Senate and Assembly, between the Democrats and Republicans and between the legislative and the executive branch of the State government since the present administration took hold as there is to-night (Jan. 25) over the sagacity displayed by the ways and means committee. Everybody's face has been saved. The danger of any too deep delving into the doings of the many committees and commissions has been averted."

A perfunctory meeting of the Thompson committee was held on Jan. 27, adjournment being taken to permit the chairman to speak in Brooklyn on the subject "What Our Committee Has Uncovered." The Senator declined to predict the line of inquiry to be followed hereafter.

CINCINNATI RAPID TRANSIT PLAN ADOPTED

At a meeting on Jan. 21 the Rapid Transit Commission of Cincinnati, Ohio, adopted modified plan No. 4 for the route of the rapid transit belt line. In the beginning this belt lint will serve as a nucleus for a rapid transit system for the entire city. It will consist of a double track around the entire course, but the commission has planned spur tracks to take care of portions of the city which the main line does not reach. These tracks will not be built, however, until the main line has proved a success. The commission will ask the voters to pass on a bond issue of $6,000,000 in April, sufficient for the construction of the double track of the main line only. The belt line will be known as the Cincinnati Rapid Transit & Interurban Railway.

The road will be double track and standard gage the entire distance. This will affect the three lines of the Interurban Railway & Terminal Company, the Millcreek Valley Line, the Cincinnati, Georgetown & Portsmouth and the Cincinnati, Milford & Loveland roads, all of whose tracks are broad gage. The lines of the Ohio Electric Railway, the Cincinnati & Columbus Traction Company and the Indianapolis & Cincinnati Traction Company are all standard gage. Engineers estimate that a third rail, to allow the cars of the broad gage roads to use the loop, would entail an additional cost of $150,000, while it will cost the three roads mentioned $112,000 to change their track and equipment to standard gage.

The main passenger and freight station will be built by the time the road is ready for operation, and all interurban cars will be allowed to use it. All passenger cars using the loop must be of metal construction under the decision reached. Freight cars will be allowed to use it at fixed hours between the rush hours and in the early morning hours.

Members Edward Dornette and W. A. Hopkins were appointed a committee to take part in a conference between City Engineer Frank Krug and officials of the Interurban Railway & Terminal Company and the Cincinnati, Georgetown & Portsmouth Railroad relative to making connection with the line. A plan has been suggested by which both may connect over the same track.

The main passenger and freight terminal will be on the site of the city hospital. Other stations will be located at other convenient points.

Mr. Krug was chosen administrative head of the interurban project by the Rapid Transit Commission at its meeting on Jan. 22.

CLEVELAND COUNCIL ACTS ON SEVERAL MATTERS

Fielder Sanders, street railway commissioner, of Cleveland, Ohio, at the Council meeting on the evening of Jan. 24 reported adversely on the plan of giving school children free transfers.

Councilman William Stolte introduced an ordinance providing for the selection of the street railway commissioner by the Council in the future. He argued that this official's duties are to keep Council informed of all conditions pertaining to the operation of the road and that he should not be appointed by the Mayor.

The resolution, recently introduced, requiring that chairs be supplied in street cars for conductors was adopted. Mr. Sanders advised the committee to which this resolution was referred that the company did not favor the idea because conductors, when seated, cannot see people leaving the cars and the number of accidents will likely be increased on this account.

It is possible that the people will be asked to decide whether all cars shall be stopped on the near side of the street. Mr. Sanders reported to the street railway committee of the Council that opinion seems to be about evenly divided. No action was taken on the ordinance requiring all cars to be operated pay-as-you-enter when going toward the Public Square and pay-as-you-leave when going in the opposite direction. Mr. Sanders said the plan would be impractical on some of the lines.

The committee reported adversely on the ordinance to extend the East Seventy-ninth Street line of the Cleveland Railway to Broadway and along East Seventy-first Street to Lansing Avenue.

AS MAYOR ROLPH SEES THE MUNICIPAL RAILWAY

James Rolph was sworn in on Jan. 8 as Mayor of San Francisco, Cal., for another four-year term. In discussing the municipal railway he said in part:

"The municipal railway system was established not only to make profits for the taxpayers but to provide service. It has done both in such excellent fashion that the extension of the system will not only be a financial success, but insure the growth of San Francisco.

"We should extend our municipal transportation system, commencing at the terminus of the Geary Street system at the beach, along the beach to Sloat Boulevard, and thence along Sloat Boulevard to and through the Twin Peaks tunnel. This tunnel is one of the most valuable assets of the municipality, and the control of it for traffic at all times must be retained by the public. Plans should be formulated immediately for the extension of the Municipal Railway system from the tunnel and down Market Street to the ferry in order to provide rapid transportation for the Sunset and Ingleside districts.

"No time should be lost in determining the rights of the city to operate its own municipal system over its own streets, and until this question is settled municipal transportation in one form or another should be provided.

"The city, in view of the injunction granted by Judge Sewall, should take steps immediately to obtain the use of a loop at the ferry terminus for the operation thereon of the cars of the municipality, and to make provision to supply sufficient power for all cars of the Municipal Railway in conformity with Judge Sewall's recent decision.

"The Municipal Railway system should cross Golden Gate Park, thus connecting the Richmond and the Sunset districts and providing much needed transportation in these rapidly growing sections of our city. The Church Street line should be completed without delay to Thirtieth Street."

A. I. C. DEVELOPING PLANS

The $50,000,000 American International Corporation, of which Charles A. Stone of Stone & Webster is president, is slowly developing for doing business with foreign countries, and during the past month has made some important steps in its program for procedure. At the meeting of the directors on Dec. 23 George J. Baldwin, Savannah, was elected vice-president, as noted in the Electric Railway Journal of Jan. 8. Mr. Baldwin started immediately for San Francisco to look into the affairs of the Pacific Mail Steamship Company. He has returned and reported to the board the condition of this business and the possibilities for further development of the shipping business, both coastwise and trans-Pacific. He will be the representative of the corporation to devote his time especially to this matter, and will be the officer of the American International Corporation who, in association with one of the officers of W. R. Grace & Company, will especially follow the affairs of the Pacific Mail Steamship Company.

Two other important steps have been taken in the line of completing the organization of the American International Corporation. Dr. Richard P. Strong, the well-known medical expert, has become connected with the corporation. His specific duties will be to assist in building up the new organization with the right kind of young men, and to follow up the men of the organization who are at work in foreign countries; and also to take up any questions that may arise with foreign countries in regard to sanitary and health conditions.

Philip Henry, a well-known engineer, who has given much of his time to the investigation and construction of railroad and other enterprises in South America, has been elected vice-president of the corporation.

A committee of five directors has been formed to look after navigation matters. This committee consists of W. L. Saunders, Robert Dollar, J. P. Grace, James J. Hill and John D. Ryan.

Between 500 and 1000 proposals have already been submitted to the corporation for consideration. It is purposed to employ a large number of young men, most of whom will be college graduates, and to educate them for permanent positions in the foreign field.

SUPREME COURT UPHOLDS STATES' RIGHTS IN WATER POWERS

The Supreme Court of the United States handed down a decision on Jan. 24 affirming that the several States of the United States possess the power to enact laws authorizing condemnation of water power sites and water rights by right of eminent domain. The decision was in connection with the upholding of the constitutionality of the Alabama water power condemnation statutes, in a case growing out of the improvement of the Tallapoosa River. In the decision, which was rendered by Justice Holmes, it is stated:

"The principal argument is that the purpose of the condemnation is not a public one. It may sometimes be difficult to draw the line that is supposed to limit the authority of the legislature to exercise or delegate the power of eminent domain. But to gather the streams from waste and to draw from them energy, labor without brains, and so to save mankind from toil that it can be spared is to supply what, next to intellect, is the very foundation of all our achievements and all our welfare, and if that purpose is not public we should be at a loss to say what is."

STRIKING CARMEN'S UNION PUTS UP NOVEL DEFENCE

While evidence was being heard by Judge J. B. Woodward to support the motion of the Wilkes-Barre (Pa.) Railway for a permanent injunction against its striking carmen to restrain them from interfering in any way with the operation of the cars, counsel for the strikers declared that the union, as a body, was not responsible for the breaking of the arbitration contract. The contention was that a committee represented the union, but that the union, under its law, must ratify any act of its representatives. While an agreement was being negotiated the strike was called, arbitration having failed to settle the difference. The lawyers representing the men contended that the union did not ratify the arbitration because the members never acted on it.

BIOGRAPHIES OF NEW MICHIGAN RAILWAY OFFICERS

Brief biographies follow of some of the newly appointed operating officials of the Michigan Railway, Jackson, Mich., mentioned in the ELECTRIC RAILWAY JOURNAL of Jan. 8, page 99, and not so well known as the other officers of the company:

J. H. Weldon, chief of the tariff bureau, began work with the Michigan United Railways' tariff department in April, 1909.

A. J. Bray, the newly appointed auditor of the Michigan Railway, began service with the Michigan United Railways in July, 1906, as chief clerk to the secretary. In March, 1912, he was made auditor of the Michigan United Traction Company, which position he held at the time of his recent appointment.

F. N. Aldrich, auditor of disbursements, began work with the Michigan United Traction Company as a clerk in 1912.

J. W. Slater, auditor of receipts, became connected with the Michigan United Railways Company in 1909. He started as a clerk, checking conductors' turn-ins and car records.

O. H. Degener, auditor of freight accounts and car accountant, began work with the Michigan United Railways' freight department in November, 1907.

J. A. Rosenberger, superintendent of the Owosso and Corunna city lines, was formerly assistant auditor of the Terre Haute, Indianapolis & Eastern Traction Company, Indianapolis, Ind. He joined the operating organization of the Michigan United Traction Company in 1912, and was made superintendent of transportation of the Owosso and Corunna city lines in October, 1914.

C. H. Smith, superintendent of the Northeastern Division, was formerly assistant to the superintendent of the Michigan United Railways at Kalamazoo. In 1912 when the Michigan United Traction Company leased the Michigan United Railways, Mr. Smith was made superintendent of transportation at Kalamazoo. In June, 1914, he was moved to Saginaw as superintendent of transportation of the Saginaw-Bay City Railway Company.

APPLICATION FOR ABANDONMENT REFUSED

A. W. Leonard, president of the Puget Sound Traction, Light & Power Company, Seattle, Wash., filed a petition with the City Council recently asking permission in the name of the company to relinquish its franchise to operate cars on Twenty-third Avenue. The company desires to surrender franchise rights granted by an ordinance approved in November, 1907, extending from Louise Street on the north to Jefferson Street on the south. Mr. Leonard states that the Twenty-third Avenue line has always been operated at a loss. It is estimated that it cost the company approximately $165,000 to install the railway. To tear out the tracks and restore the right-of-way would cost $65,000. The Public Service Commission recently directed the company to operate its Twenty-third Avenue cars downtown in the morning and evening rush hours by way of Madison and Pike Streets. To comply with the order the company would have to construct additional tracks at considerable cost. Mr. Leonard says the company is not receiving a return in excess of 5 per cent upon the value of its entire street railway properties in the city.

The franchise committee of the City Council has denied the application of the company for permission to relinquish its franchise on Twenty-third Avenue and to discontinue the operation of that line. The company's only recourse now is to apply to the courts for an annulment of the Public Service Commission's ruling or for an order compelling the city of Seattle to set aside the Twenty-third Avenue franchise.

Increase in Wages by Wilmington Company.—The employees of the New Castle and the Delaware City lines of the Wilmington & Philadelphia Traction Company, Wilmington, Del., have received notice of a raise of 2 cents an hour. The men now receive 6 cents an hour more than they did six months ago.

Subway Approaches to New Bridge at Cleveland.—On Jan. 19 the Commissioners of Cuyahoga County authorized a bond issue of $500,000 for the construction of subway approaches to the new Superior-Detroit Avenue bridge across the Cuyahoga River. The entire cost of the approaches is estimated at $850,000 and it is believed that Mayor Davis will sign the ordinance placing the entire matter in the hands of the commissioners.

Contributions Solicited for Hatters.—W. D. Mahon, international president of the Amalgamated Association, appealed to the officers and members of the association to observe Jan. 27, the anniversary of the birth of Samuel Gompers, president of the American Federation of Labor, by contributing one hour or more of their pay to the cause of the Danbury hatters, against whom judgment was obtained in the famous boycott case.

New Bedford Company Refuses Demands. — The Union Street Railway, New Bedford, Mass., has refused the demand of the local branch of the Amalgamated Association for a flat rate of 35 cents an hour for all platform men. About 500 men are in the company's service, the present rates ranging from 25 to 30 cents an hour on a six-years' graduated scale. Various other concessions in working conditions were refused by the company.

Severe Storms in Northwest.—Owing to unusual storms which have swept over the entire Northwest, and particularly eastern Washington, since Jan. 1, service on the electric lines operating out of Spokane, Wash., has been considerably disrupted. Officials state not since the first electric railway was built out of Spokane fifteen years ago have trains had as much difficulty in operating as at the present time. Oon Jan. 22 drifts from 20 ft. to 30 ft. deep were reported in some places.

Hearings on the Pittsburgh Ordinances.—The first of the councilmanic hearings on the proposed ordinances to the Pittsburgh (Pa.) Railways introduced at the last meeting was held on Jan. 21 by the Councilmen sitting as the committee on public service and surveys. No action was taken and another hearing was set for Jan. 26. It is expected still other hearings will be held. It was decided by the Councilmen to take up the ordinances by groups, and, if desired, hearings on each group will be held. At the meeting scheduled for Jan. 26 it was proposed to consider the ordinances for turnouts, switches and curves.

Norfolk Franchise Considered.—The sub-committee on franchise and taxation of the joint committee of ten, representing the City Council and the business organizations of Norfolk, in the matter of the proposed new franchise for the Virginia Railway & Power Company, met on Jan. 14 and went over the situation generally. The final date of the conclusion of the matter depends on a report from the sub-committee on commercial electric light and power rates. Entirely outside of the transportation and the electric light and power questions, the company will, it is understood, submit to the committee a new schedule of gas rates.

Mayor Smith on the Philadelphia Transit Program.—Mayor Smith of Philadelphia, Pa., is quoted as follows in regard to the rapid transit program for that city: "I feel that the program for building the Broad Street subway and Frankford elevated line represents as much as it is advisable to take up right away. I feel that at this time we should devote our energies to the two pieces of work under contract. I would not say, however, that the other two lines should not be started until Broad Street and Frankford are completed. I will find out the real demand, the amount of travel and other data, and will judge from that whether the lines should be advocated."

Massachusetts Supreme Court Refuses to Order Subway Construction.—Judge Crosby of the Massachusetts Supreme Court has dismissed a petition for a writ of mandamus to compel the Boston Transit Commission to begin the constrution of a subway between City Square and Sullivan Square, Charlestown, to supersede the elevated structure of the Boston Elevated Railway. An act of the last Legislature was claimed by the petitioner to be mandatory, but the court holds that as the Boston Elevated Railway has refused to enter into a contract with the city of Boston for the use and occupation of the tunnel thus provided the commission is not required to construct the subway in accordance with the act.

Puget Sound Electric Railway Lays Its Case Before Public.—On Nov. 15 a committee of the Puyallup Commercial Club addressed the Public Service Commission of the State of Washington on matters relating to rates on the Puyallup Short Line branch of the Puget Sound Electric Railway. This communication brought a reply from the Public Service Commission, which goes exhaustively into the facts and history of the whole rate question. It being suggested that this clear and comprehensive statement of the commission would be of interest to the people in the communities served by the Puget Sound Electric Railway, the two letters have been reprinted by the company in pamphlet form for general distribution among the riding public.

Wages Up 2 Cents to 3 Cents an Hour in Richmond.—A general increase in the wages of motormen and conductors over its entire system, including Richmond, Norfolk, Portsmouth and Petersburg, was made effective by the Virginia Railway & Power Company as of Jan. 1. The increase will be applied as follows: first-year men, from 18 to 20 cents an hour; second-year men, from 19 to 21 cents an hour; third-year men, from 20 to 22 cents an hour; fourth-year men, from 21 to 23 cents an hour, and men in service five years or longer, from 22 to 25 cents an hour. Ten years ago the maximum wage for motormen and conductors was 15 cents an hour. The new wage scale, therefore, represents an increase of approximately 66 2/3 per cent over the pay current at the beginning of the present decade.

Railway Mail Pay Question Again.—A substitute proposal that the Interstate Commerce Commission shall determine what the Government shall pay to the railroads for the transportation of the mails was made before the House committee on post-offices on Jan. 24 by railroad officials appearing in opposition to the Post-office Department plan to change the existing system of payment. The Post-office Department is advocating legislation that would require the railroads to handle the mails on a "space basis," rather than by weight. This recommendation, generally opposed by railroad interests has been met with the counter-suggestion that the matter of pay be left to the Interstate Commerce Commission, with proviso that the pay shall be continued on the weight basis and the mails shall be weighed yearly instead of quadrennially.

United States Supreme Court Passes on Compensation Act.—The United States Supreme Court on Jan. 17 construed the Washington State workmen's compensation law as abolishing all damage actions in the courts by workmen in the hazardous employments covered by the law, whether against employers or against third persons. The decision was in a case in which the widow and children of Benjamin Meese sued the Northern Pacific Railroad for the alleged negligent killing of Meese, an employee of a brewery, at Seattle, Wash., alongside the railroad's tracks. The District Court held the compensation law abolished all actions for damages, and dismissed the suit, but the Circuit Court of Appeals held that it abolished litigation only of employees against their employers. The Supreme Court upheld the District Court's interpretation and reversed the Circuit Court of Appeals.

Report on Water Power Control.—According to a special report sent to Congress on Jan. 20 by the Department of Agriculture eighteen corporations are shown to be in control of more than half of the water power employed in the operation of public utilities, while more than one-quarter of it is controlled by Stone & Webster Management Associations, Montana Power Company, Utah Securities Corporation, E. W. Clark & Company Management Corporation, Southern Power Company and Hydraulic Company of Niagara Falls. The report places the potential water water resources of the country at a minimum of 27,943,000 hp. and the maximum at 53,905,000. Private power interests reported in 1912 a total investment of more than $2,000,000,000, as represented by the item "cost of construction," averaging $391 per horsepower of primary power installation. Municipal stations reported an aggregate cost of $77,000,000, averaging $188 per horsepower. The Secretary made no recommendations because none was requested.

Toronto Mayor Discusses Railway Problems.—Mayor Church of Toronto, Ont., in his inaugural address on Jan. 10 briefly reviewed the work accomplished last year, and then outlined the matters which demand the attention of the new Council. Dealing with the hydro-electric radial railway, he said that the passing of the by-law showed that the people were determined to have absolute control of the transportation facilities within the city limits. He said the first thing the new Council should do to give expression to the wishes of the people was to appoint a traffic commission, consisting of the city treasurer, works commissioner, harbor engineer, corporation counsel, the Mayor and one other member of the Council. This commission should begin work immediately to prepare the way for the taking over of the Toronto Railway at the expiration of the franchise in 1921. While in favor of the operation of motor buses as a means of solving the transportation problem, he was opposed to granting any more franchises for the use of the streets by any private companies.

PROGRAMS OF ASSOCIATION MEETINGS

Central Electric Railway Association

The annual meeting of the Central Electric Railway Association will be held at the Hotel Miami, Dayton, Ohio, on Feb. 24 and 25. The executive committee meeting will be held at the same place on the evening of Feb. 23 and afternoon of Feb. 25.

New England Street Railway Club

The date of the sixteenth annual meeting and dinner of the New England Street Railway Club will be March 23, 1916. Definite decision as to where the banquet will be held has not yet been made, but the choice is between the Copley-Plaza and the Hotel Somerset, Boston.

American Museum of Safety

Dr. W. H. Tolman, director of the American Museum of Safety, announces that the annual dinner of that organization is to be held at the Waldorf-Astoria hotel, New York City, Thursday evening, Feb. 3. Addresses will be made by W. A. Fairburn, Wilbur C. Fisk and Elmer A. Sperry. The winners of the five gold medals annually awarded by the museum will be announced on this occasion.

Financial and Corporate

ANNUAL REPORT

Southern Pacific Company-Affiliated Electric Lines

The results of the activities of the affiliated electric lines of the Southern Pacific Company for the year ended June 30, 1915, are shown in the accompanying table. As compared to the preceding year, the total deficit increased from $1,161,462 to $1,444,117, an amount of $282,655 or 24.3 per cent. This was made up of an increase of $2,222 in surplus for the Stockton Electric Railroad, and increases in deficits for all the other lines as follows: Pacific Electric Railway, $73,420; Fresno Traction Company and Fresno City Railway (combined), $10,261; Visalia Electric Railroad, $3,884; San José Railroads, $9,334; Peninsular Railway, $23,289, and Portland, Eugene & Eastern Railway, $164,689. During the year ended June 30, 1915, the railway operating revenues of the seven affiliated companies decreased $655,095 or 5.9 per cent, but the railway operating expenses also decreased $575,603 or 7.3 per cent, so that the net revenue from railway operation was less by only $79,493 or 2.5 per cent. The taxes assignable to railway operation increased $27,504 or 4.8 per cent, and the operating income suffered a loss of $107,008 or 4.1 per cent. The non-operating income showed a slight change for the better, but the deductions from gross income increased $176,801 or 4.6 per cent. Consequently the net income figure or deficit for the year showed the loss before stated.

On account of the different form of presentation for the annual report in 1915 and 1914, the foregoing figures may not be exactly accurate, but they are sufficiently so to show the general tendency for the combined lines. The decrease in railway operating revenues was spread over all the seven companies with the exception of the Visalia Electric Railroad, which showed a small increase of $674 or 0.6 per cent. The Pacific Electric Railway had a loss in this item of $592,976 or 6.2 per cent, which accounted for about 90 per cent of the combined loss of $655,095 for the year. Owing to the facts, however, that the Pacific Electric Railway alone contributed more than 85 per cent of the total railway operating revenues of $10,292,682 and that practically all the other lines also showed losses in proportion to their size, it is evident that the causes of such returns were quite widespread.

In general it may be said that there was no change of any account in the rates of the electric lines in California during the last year or in the year preceding, but the use of private automobiles and the extensive development of the jitney movement interfered seriously with the passenger revenue of all the electric lines. It is said that there are about 47,000 privately-owned machines in Los Angeles County alone, this number having shown a considerable increase during the last year. Some of the decrease in revenues was caused by changes in accounting rules following the Interstate Commerce Commission classifications, and the earnings from the wharves and other outside operations were naturally less than during the previous year on account of the general dullness in business. It is stated, however, that this dullness has now a tendency to disappear, and business prospects are much better than they were at this time last year. The various lines are practically holding their own at present, but it is believed that they will continue to suffer from the jitney competition until public regulation of such carriers, which is becoming stronger and stronger, finally places upon them some real part of the public obligations that electric railways have to bear. One comforting point is the fact that the freight business is developing very satisfactorily.

In view of the size of the Pacific Electric Railway, some details in regard thereto are worthy of note as emphasizing the general points previously mentioned. Although the total railway operating revenues of this company, as before stated, showed a decrease of $592,976, the loss would have been much greater had it not been for the substantial increase in freight revenues. This increased $207,936 or 17.2 per cent, while the passenger revenue decreased $473,456 or 6.4 per cent, and other-transportation revenue decreased $327,455 or 36.5 per cent. The increase in freight revenue was largely caused by the increased interchange of transcontinental traffic with the steam railroads, which more than overcame the decrease brought about by the hard times and the motor-truck competition. It would seem that under anything like equal obligations to the public the company would be able to meet quite successfully the competition of motor trucks, as public utilities, except for very short hauls.

In regard to passengers carried by the Pacific Electric Railway, there was an actual decrease for the last fiscal year from 82,084,416 to 76,070,474, an amount of 6,013,942

FINANCIAL AND OPERATING STATISTICS FOR AFFILIATED ELECTRIC RAILWAYS OF SOUTHERN PACIFIC COMPANY FOR YEAR ENDED JUNE 30, 1915

	Total	Pacific Electric Railway	Fresno Traction Company and Fresno City Railway (Combined)	Stockton Electric Railroad	Visalia Electric Railroad	San Jose Railroads	Peninsular Railway	Portland, Eugene & Eastern Railway
Railway operating revenues	$10,292,682	$8,874,507	$231,330	$200,127	$98,736	$346,547	$292,494	$248,939
Railway operating expenses	7,242,141	6,026,802	181,143	129,963	87,653	249,463	263,698	303,418
Net revenue (or deficit) railway operations	$3,050,540	$2,847,705	$50,187	$70,164	$11,083	$97,084	$28,796	*$54,478
Taxes assignable to railway operations	$589,406	$496,477	$12,563	$10,721	$4,300	$19,046	$15,809	$30,491
Uncollectible railway revenues	11	.....	.....	.....	.....	.....	.....	11
Total	$589,417	$496,477	$12,563	$10,721	$4,300	$19,046	$15,809	$30,502
Operating income (or loss)	$2,461,123	$2,351,228	$37,624	$59,443	$6,783	$78,038	$12,987	*$84,980
Nonoperating income	116,984	‡148,130	18,958	2,616	220	6,682	21,597	18,779
Gross income (or loss)	$2,578,107	$2,399,358	$56,582	$62,059	$7,003	$84,720	$34,584	*$66,201
Deductions from gross income:								
Interest on funded debt	$2,977,085	$2,785,600	$42,388	.....	.....	$124,097	$25,000	.....
Interest account with Southern Pacific Company	865,639	147,233	39,634	$7,611	$89,239	33,181	219,367	$329,373
Interest on other unfunded debt	19,513	13,657	115	23	61	117	5,515	25
Amortization of discount on funded debt	88,593	83,044	3,034	.....	.....	2,513	.....	.....
Other deductions	71,394	53,345	1,877	.....	.....	524	4,231	11,416
Total deductions	$4,022,224	$3,082,879	$87,048	$7,634	$89,300	$160,432	$254,113	$340,814
Net income (or loss)	*$1,444,117	*$683,521	*$30,466	$54,425	*$82,297	*$75,712	*$219.529	*$407,015
Tons of commercial freight carried	2,318,007	2,251,342	.....	.....	§	.....	§	66,665
Revenue passengers carried	100,608,827	76,070,474	5,248,580	4,658,303	138,052	8,419,867	2,994,512	3,079,039
Total revenue car mileage	38,563,972	31,433,177	1,348,560	1,012,344	248,607	1,957,731	1,145,395	1,418,158
Total single track mileage	1,429.48	1,058.37	45.01	19.49	48.69	42.64	81.64	†133.64

*Loss. †Includes 73.02 miles of steam lines. ‡Does not include interest amounting to $331,642 accrued during the year on advances to the Pacific Electric Land Company. §Figures not available.

or 7.3 per cent. The former figure is the correct one for the year ended June 30, 1914, instead of that published in the report of the Southern Pacific Company for this period. A number of conflicting causes gave the general result as to passenger decrease *versus* revenue decrease. The passenger total was affected by the hard times, the motor buses and the good roads for the private automobile traffic. The passenger revenue was affected by these and also by the relatively decreased number of round trips and single trips on the old lines as compared with the total, and also by the strong inclination to use commutation books. This was in part offset, however, by the opening of the through line between Riverside and San Bernardino on the one hand and Los Angeles on the other, thus giving a large average revenue per passenger for about 60 miles of ride.

In explanation of the note in the preceding table, to the effect that the Pacific Electric Railway does not include in non-operating income the interest amounting to $331,642 accrued during the year on advances to the Pacific Electric Land Company, it may be said that the railway company through its land companies has a very large investment in real estate, amounting to some millions of dollars, but it takes no credit in its earnings for money advanced to these companies. This of course affects the income showing unfavorably, but it is nevertheless proper and conservative accounting until such time as it shall have been demonstrated by sale of the land or its use for other purposes that the investment has made its way.

An interesting item in connection with this company's report is the fact that for the year ended June 30, 1915, it included in operating expenses charges paid to steam-line neighbors for track rentals and the use of terminals, equipment, etc., amounting to $140,930 as compared to $108,623 for the preceding year. Under power and maintenance of equipment there was also included in operating expenses an item of $277,019 for depreciation as compared to $280,768 for the preceding year. For equipment retired during 1915 there was charged an additional amount of $25,691 as compared to $25,228 in 1914. There were no noteworthy changes in physical property during the year, except the completion of the line between Riverside, San Bernardino and Los Angeles in July, 1914, and between Corona and Riverside in February, 1915.

PROGRESS OF IOWA INTERURBAN LINES

The report just issued by the Board of Railroad Commissioners of Iowa for 1914 contains the financial and operating statistics of electric interurban railways for the year ended June 30, 1914. Comparative statistics for the years from 1903 to 1914 are also published, as shown by the accompanying table. There was an increase of 33.50 miles

Comparative Statistics of Electric Interurban Railways in Iowa from 1903 to 1914

Year	Mileage, Single Track	Gross Earnings from Operation	Operating Expenses	Net Earnings	Net Earnings Per Mile
1903	98.27	$228,445	$132,621	$95,824	$975
1904	102.41	342,559	217,320	125,239	1,223
1905	151.41	497,645	316,795	180,850	1,194
1906	183.30	629,576	394,486	235,090	1,282
1907	184.51	770,338	476,755	293,583	1,591
1908	245.18	942,780	601,746	341,034	1,391
1909	361.91	1,258,279	734,587	523,693	1,447
1910	373.92	1,450,136	951,894	498,243	1,332
1911	343.25	1,695,991	1,100,354	595,637	1,735
1912	342.74	1,823,192	1,272,340	550,852	1,607
1913	394.23	2,330,385	1,453,624	876,761	2,224
1914	427.73	2,682,102	1,722,072	960,030	2,244

in the mileage of the interurban companies in 1914. The Davenport & Muscatine Railway showed a decrease of 10 miles, for the 1913 report included the mileage of the street railway lines in Muscatine, now eliminated. The Fort Dodge, Des Moines & Southern Railroad showed an increase of 0.22 mile. The Iowa Railway & Light Company reported an increase of 20.06 miles for new line constructed, and the Waterloo, Cedar Falls & Northern Railway showed a similar increase of 25.81 miles. There was also a decrease of 2.59 miles for the mileage of the Ames & College Railway, this company being controlled by the Fort Dodge, Des Moines & Southern Railroad, and the mileage being included with this company.

BROOKLYN REVENUES ARE GAINING

The operating results of the Brooklyn (N. Y.) Rapid Transit System for the quarter and the six months ended Dec. 31, 1915, are shown in the following table:

Quarter Ended Dec. 31, 1915.

	1915	1914
Gross operating revenue	$6,747,126	$6,367,973
Operating expenses	3,854,443	3,684,069
Net from operation	$2,892,683	$2,683,904
Taxes	423,787	425,057
Operating income	$2,468,896	$2,258,847
Non-operating income	107,649	105,979
Gross income	$2,576,545	$2,364,826
Income reductions	1,209,404	1,188,057
Net income	$1,367,141	$1,176,769

Six Months Ended Dec. 31, 1915.

	1915	1914
Gross operating revenue	$14,048,444	$13,607,760
Operating expenses	7,716,609	7,521,934
Net from operation	$6,331,835	$6,085,826
Taxes	855,719	859,928
Operating income	$5,476,116	$5,225,898
Non-operating income	237,184	221,687
Gross income	$5,713,300	$5,447,585
Income deductions	2,371,766	2,350,592
Net income	$3,341,534	$3,096,993

For the last quarter in 1915 as compared to the corresponding quarter in the preceding year the gross operating revenues of the system increased $379,153 or 5.9 per cent, and the operating expenses increased $170,374 or 4.6 per cent, so that the net revenue from operation increased $208,779 or 7.7 per cent. Taxes showed a slight decrease of $1,270 or 0.3 per cent, non-operating income $1,670 or 1.5 per cent, and income deductions $20,747 or 1.7 per cent, with the result that the net income for the period increased $190,372 or 16.1 per cent.

The progress made during the last quarter was naturally greater than that made during the preceding quarter, as is indicated by comparing the foregoing returns with the comparative figures for the whole six months' period in 1914 and 1915. During the six months ended Dec. 31, 1915, the gross operating revenue increased $440,684 or 3.2 per cent. The operating expenses increased $194,665 or 2.6 per cent, and the net from operation increased $246,009 or 4 per cent. Taxes decreased $4,209 or about 0.5, and non-operating income increased $15,497 or 6.9 per cent, but income deductions increased $21,174 or 0.9 per cent. The net result was a gain of $244,541 or 7.8 per cent in net income for the six months.

CLEVELAND RAILWAY HOLDS MEETING

At the annual meeting of stockholders of the Cleveland (Ohio) Railway on Jan. 26, it was reported that the company enjoyed a marked increase in travel during the last four months, and it now appears that it will not be necessary to increase the rate of fare. The penny charge for transfers will wipe out the deficits, it was said, if the city would permit it to continue for that purpose. If not, then the company will have to go to the city for an increase in fares that will accomplish this result.

In his report President J. J. Stanley stated that the track department has recommended the renewal of about 28 miles of track during the present year at an estimated cost of about $1,000,000, and the purchase of four automobile trucks. A storehouse for miscellaneous track supplies, a cement storage house and a salt storage house should be erected on the property on Harvard Avenue, he said, and additional tracks should be laid in the yards at that point. The power department has recommended miscellaneous improvements which, plus 15 per cent for engineering and contingencies, make a total of $507,840.

The only considerable extension of track to be laid this year is about 3 miles on Madison Avenue in Lakewood. The proposed extension on East Thirtieth Street will probably not be built this year, as the sewer in the street has not been completed. President Stanley said that the proposed Clark Avenue extension cannot be completed until after the city finishes a bridge under construction. He also said that just at present there is no intention of issuing any more

of the stock, but what may be done in the future depends upon the requirements the city may make in the way of improvements and extensions.

Brazilian Traction, Light & Power Company, Ltd., Toronto, Ont.—A quarterly dividend of 1 per cent has been declared on the ordinary stock of the Brazilian Traction, Light & Power Company, Ltd., payable on March 1 to holders of record of Jan. 31. Owing to the unsettled conditions brought about by the war, the dividend was reduced in September, 1915, to one-half of 1 per cent, previous to which 1½ per cent had been paid each quarter.

Cities Service Company, New York, N. Y.—A monthly dividend of one-half of 1 per cent on the preferred stock of the Cities Service Company has been declared payable on Feb. 1 to holders of record on Jan. 15. This is in accordance with the announcement made in November, 1915.

Cleveland & Eastern Traction Company, Cleveland, Ohio.—At the annual meeting of the stockholders of the Cleveland & Eastern Traction Company, A. G. Tame, C. Brand, Horatio Ford and H. P. McIntosh, Jr., were elected as new members to the board of directors. Mr. Ford and Mr. McIntosh were elected to the board of the Cleveland & Chagrin Falls Railway, formerily the Cleveland, Youngstown & Eastern Railway, which is closely associated with the Cleveland & Eastern Traction Company.

Cleveland (Ohio) Railway.—The operating report of the Cleveland Railway for December, 1915, shows that the operating revenue was $741,974, compared with $676,197 for the corresponding month in 1914. The actual maintenance and operating expenses for the month aggregated $507,338, while the ordinance allowance was $467,655. The maintenance deficit was $27,659, making a total accumulated deficit in that fund of $593,148. The operating deficit was $12,023, bringing the total operating deficit up to $70,765. The amount received from transfers was $64,217, compared with $57,453 in December, 1914. The interest fund at the end of the year was $542,651. This fund has gradually increased through the winter months, but during the warm weather last year it showed a constant decrease. The increase in December was $45,456, which was the ordinance surplus, but the actual surplus was only $11,863. These figures represent the condition of the fund when Fielder Sanders assumed the office of street railway commissioner.

Danbury & Bethel Street Railway, Danbury, Conn.—Suit to recover $450,000 damages has been brought against officers of the Danbury & Bethel Street Railway by John H. Henshaw, trustee for the estate of George E. Pond. The suit grew out of the recent merger by purchase of the Bridgeport & Danbury Electric Railway by the Danbury & Bethel Street Railway. Mr. Henshaw, in his complaint, alleges that the Danbury & Bethel Street Railway as a result of the merger was made liable for the debts of the Bridgeport & Danbury Electric Railway, to the injury of the estate, which owns stock of the Danbury & Bethel Street Railway.

Glendale & Montrose Railway, Glendale, Cal.—As a result of the investigation upon the California Railroad Commission's own motion to determine the various elements entering into the value of the company's property it is found that the reproduction cost of the operative physical property as of March 31, 1915, is the sum of $204,350, including non-operative property, $205,975; that the reproduction cost less depreciation or present value of the operative physical property of respondent as of March 31, 1915, is the sum of $189,408, including non-operative property, $191,001.

Grand Valley Railway, Brantford, Ont.—The city of Brantford is applying to Parliament for authority to take over the Grand Valley Railway, to extend the line to the village of Cainsville, and to operate it as the Brantford Municipal Railway. Authority is also asked for placing the railway and other municipal utilities under the management of a commission.

Interborough Rapid Transit Company, New York City.—Harris Forbes & Company; Lee, Higginson & Company, and Kissel, Kinnicutt & Company are offering the unsold balance of $25,000,000 of Interborough Rapid Transit Company first and refunding 5 per cent bonds, due in 1966, at 99½ and interest.

Kansas City (Mo.) Railways.—Attorneys for the protestors against the franchise of the Kansas City Railways are preparing to appeal from the decision of the State Public Service Commission denying a rehearing of the reorganization plan of the street railway and light properties. The appeal will be in the Cole County Circuit Court, from which the proceedings would go to the State Supreme Court. The proceedings will have to do only with the validity of the franchise. Plans for the reorganization are proceeding, however, the position of the parties at interest, including the city, being that the decrees and decisions of Judge Hook and the Public Service Commission practically guarantee the validity of the franchise.

Lehigh Valley Transit Company, Allentown, Pa.—The Lehigh Valley Transit Company has declared a quarterly dividend of 1¼ per cent on the preferred stock, payable on Feb. 10 to holders of record of Jan. 31. The last dividend declared by this company was a semi-annual one of 2½ per cent in October last. Previous to that time the company had been making semi-annual payments of 1 per cent for some time.

Ohio Traction Company, Cincinnati, Ohio—The Ohio Traction Company has notified the holders of its $8,500,000 of 5 per cent preferred stock that the quarterly dividend due on Feb. 1 will not be paid, and further dividends will be deferred. A year ago the company passed the dividend on its common stock. Officials of the company say that while earnings are sufficient to provide for payment of dividends on the preferred issue, the approaching revision of franchise provisions in Cincinnati, and the increased cash requirements for serial note maturities and improvements, made the passing of the preferred dividend advisable.

Philadelphia Company, Pittsburgh, Pa.—The Philadelphia Company has called for redemption on Feb. 2 the two issues of 7 per cent interest-bearing scrip, aggregating $1,352,933, which were issued to pay dividends on Nov. 2, 1914, and Feb. 1, 1915.

Pittsburgh (Pa.) Railways.—The Consolidated Traction Company, operated by the Pittsburgh Railways, has sold to the Colonial Trust Company, Pittsburgh, $500,000 of 5 per cent car trust bonds which will be offered at par and interest. The bonds mature in ten annual installments of $20,000 each, beginning with April 1, 1917. The bonds are a first lien on twenty-five double-truck steel motor cars and twenty-five double-truck steel trailers, costing $221,000, of which amount $21,000 cash has been paid by the company.

Public Service Corporation of New Jersey, Newark, N. J.—An increase of 10.8 per cent was shown by the Public Service Corporation of New Jersey in gross business for December, 1915, as compared with the corresponding month of the year previous, and the gross business for the year showed an increase of 5 per cent. For December, 1915, the gross increase in total business amounted to $345,889, and the balance available—after payment of operating expenses, fixed charges, sinking fund requirement, etc.—for amortization, dividends and surplus was $593,096. The increase in surplus available for dividends over the corresponding month of 1914 was $44,971. For the twelve months ended Dec. 31, 1915, the gross increase in total business was $1,781,395. The balance available for amortization, dividends and surplus totaled $4,065,434, and the increase in surplus available for dividends was $263,216.

Southwestern Traction Company, Temple, Tex.—Judge T. S. Maxey in the Federal Court at Waco on Jan. 14 appointed W. G. Haag, superintendent of the Southwestern Traction Company, receiver of the company. On Jan. 15 the Susquehanna Trust & Safe Deposit Company, Williamsport, Pa., filed a suit in equity in the United States District Court at Waco asking for the foreclosure of the mortgage of 1911, the interest on some $130,000 of first mortgage 5 per cent bonds being in default.

West Penn Traction Company, Pittsburgh, Pa.—Announcement is made that the $6,000,000 of West Penn Traction Company three-year 6 per cent secured gold notes will be called on March 1 at par and a half. The notes were sold at 99 and interest when originally offered and ranged in price in the market from 96 to 100½.

DIVIDENDS DECLARED

American Railways, Philadelphia, Pa., quarterly, 1¾ per cent, preferred.

Bangor Railway & Electric Company, Bangor, Me., quarterly, one-half of 1 per cent, common.

Brazilian Traction, Light & Power Company, Ltd., Toronto, Ont., 1 per cent, ordinary.

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly, three-quarters of 1 per cent, preferred.

Grand Rapids (Mich.) Railway, quarterly, 1¼ per cent, preferred.

Jacksonville (Fla.) Traction Company, quarterly, 75 cents, preferred.

Massachusetts Consolidated Railways, Greenfield, Mass., quarterly, 1⅜ per cent, preferred.

Monongahela Valley Traction Company, Fairmont, W. Va., quarterly, 1¼ per cent, preferred.

Philadelphia Company, Pittsburgh, Pa., 2½ per cent, preferred.

Railway & Light Securities Company, Boston, Mass., 3 per cent, preferred; 3 per cent, common.

Union Street Railway, New Bedford, Mass., quarterly, 2 per cent.

York (Pa.) Railways, $1.25, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE (LA.) TRACTION COMPANY

Period		Operating Revenues	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., Nov.,	'15	$17,671	*$8,946	$8,725	$2,204	$6,521
1 " "	'14	15,704	*9,444	6,260	2,054	4,206
12 " "	'15	189,924	*109,374	†80,550	25,824	54,726
12 " "	'14	178,083	*114,296	63,787	25,071	38,716

COLUMBUS (GA.) ELECTRIC COMPANY

1m., Nov.,	'15	$67,291	*$27,383	$39,908	$28,679	$11,229
1 " "	'14	63,274	*28,850	34,424	28,791	5,633
12 " "	'15	710,928	*322,777	388,151	344,657	43,494
12 " "	'14	678,573	*290,178	388,395	320,945	67,450

DALLAS (TEX.) ELECTRIC COMPANY

1m., Nov.,	'15	$161,525	*$98,789	$62,736	$34,067	$28,669
1 " "	'14	180,303	*96,199	84,104	33,389	50,715
12 " "	'15	1,846,740	*1,114,800	731,940	402,090	329,850
12 " "	'14	2,226,381	*1,310,289	916,092	364,241	551,851

EL PASO (TEX.) ELECTRIC COMPANY

1m., Nov.,	'15	$93,482	*$44,010	$49,472	$4,186	$45,286
1 " "	'14	91,712	*42,184	49,528	4,179	45,349
12 " "	'15	968,806	*517,509	451,297	50,378	400,919
12 " "	'14	1,041,126	*579,966	461,160	51,375	409,785

GALVESTON-HOUSTON ELECTRIC COMPANY, GALVESTON, TEX.

1m., Nov.,	'15	$168,260	*$105,554	$62,706	$36,710	$25,996
1 " "	'14	195,390	*103,121	92,269	36,752	55,517
12 " "	'15	1,965,151	*1,202,237	762,914	932,920	329,994
12 " "	'14	2,435,544	*1,323,974	1,111,570	441,465	670,105

JACKSONVILLE (FLA.) TRACTION COMPANY

1m., Nov.,	'15	$49,251	*$35,856	$13,395	$14,726	†$1,331
1 " "	'14	52,881	*37,229	15,652	13,052	2,600
12 " "	'15	614,092	*430,540	183,552	176,349	7,203
12 " "	'14	723,598	*477,286	246,312	152,325	93,987

NORTHERN TEXAS ELECTRIC COMPANY, FORT WORTH, TEX.

1m., Nov.,	'15	$145,692	*$89,001	$56,691	$26,853	$29,738
1 " "	'14	157,568	*83,848	73,720	26,808	46,912
12 " "	'15	1,718,833	*1,043,340	675,493	330,265	345,228
12 " "	'14	2,093,414	*1,166,266	927,148	312,858	614,290

PADUCAH TRACTION & LIGHT COMPANY, PADUCAH, KY.

1m., Nov.,	'15	$25,032	*$14,421	$10,611	$7,477	$3,134
1 " "	'14	24,838	*15,044	9,794	7,542	2,252
12 " "	'15	289,671	*179,861	109,810	91,529	18,281
12 " "	'14	303,576	*194,186	109,390	91,438	17,952

PENSACOLA (FLA.) ELECTRIC COMPANY

1m., Nov.,	'15	$23,516	*$12,407	$11,109	$7,050	$4,059
1 " "	'14	18,860	*12,251	6,609	7,353	†744
12 " "	'15	254,213	*146,419	107,294	85,072	21,722
12 " "	'14	271,024	*172,204	98,820	86,537	12,283

PUGET SOUND TRACTION, LIGHT & POWER COMPANY, SEATTLE, WASH.

1m., Nov.,	'15	$643,823	*$403,104	$240,719	$182,573	$58,146
1 " "	'14	686,820	*401,883	284,937	177,757	107,179
12 " "	'15	7,577,430	*4,755,539	2,821,891	2,175,308	646,583
12 " "	'14	8,523,731	*5,026,360	3,497,371	2,115,522	1,381,849

TAMPA (FLA.) ELECTRIC COMPANY

1m., Nov.,	'15	$83,696	*$44,565	$39,131	$4,342	$34,789
1 " "	'14	80,922	*41,927	38,995	4,422	34,573
12 " "	'15	980,780	*500,902	479,878	52,423	427,455
12 " "	'14	978,606	*527,136	451,470	55,123	396,347

*Includes taxes. †Deficit.

Traffic and Transportation

CONNECTICUT COMPANY'S SAFETY CONTEST

Prizes Awarded to School Children for Safety Suggestions —Megaphone Used for Directing Pedestrians

On Oct. 1, 1915, the Connecticut Company, New Haven, Conn., after having made arrangements with the State Board of Education, sent some 2500 circulars to the teachers in the public schools along the lines of the company announcing offers of cash prizes for the best essays by school children upon the subject "How I Keep Safe Upon the Streets and Roads." All competing essays were sent to the State Board of Education by Dec. 1, and the awards were made so that the local school authorities delivered the prizes to the winning pupils by Dec. 1. The judges were the members of the State Board of Education and an officer of the Connecticut Company. The essays were judged, first for their common-sense safety suggestions and, second, for their English, spelling, composition, etc.

Prior to Dec. 1 992 essays were submitted from thirty-seven different towns, sixty-three from high schools, thirteen from rural schools and 916 from graded schools. Much interest was shown in the contest by teachers and pupils. Many essays reached the office after Dec. 1, but on account of the large number that came in on time it was impossible to consider the ones that were so late that they did not correspond with the terms of the offer of the award.

After a careful reading in the office of the State Board of Education of all of the essays which were submitted on time, the awards were made to the following pupils: Graded schools—First prize of $20 to Cornelius McNamara, sixteen years old, sixth grade, Baldwin School, Watertown; second prize of $10 to Persis Jacobs, thirteen years old, Roger Sherman School, New Haven. Rural schools—First prize of $20 to Gladys Robinson, thirteen years old, Center School, Ellington; second prize of $10 to Mary Schuster, thirteen years old, Center School, Ellington. High schools—First prize of $20 to Grace M. Goodall, sixteen years old, High School, Thomaston; second prize of $10 to Beatrice M. Le Tendre, sixteen years old, High School, South Manchester.

The schools in which the awards were made seemed very much interested in the safety-first movement. Mr. Hine, secretary of the State Board of Education, gave much attention to the contest, which was conducted under the direction of S. W. Baldwin, assistant attorney of the Connecticut Company.

The essay by Miss Goodall in particular reflected great credit upon her mentors. It contained about 1400 words. She began by telling how a serious accident had set a community to thinking about safety. Relating experiences of her own and those she had witnessed or heard about, she drove home her warnings with direct illustrations. She told about a safety campaign in one city in which those conducting the work had men with megaphones stationed at various points to shout at those who crossed the streets diagonally between blocks. The publicity attendant upon offenders against safety principles having their attention thus called to their carelessness had a very noticeable effect.

COURT UPHOLDS SPRINGFIELD JITNEY MEN

Jitney bus owners of Springfield, Ill., won a victory in the Sangamon Circuit Court when Judge Creighton on Jan. 22 granted them a temporary injunction restraining the city from enforcing its jitney bus ordinance. The court declared most of the important sections of the ordinance unlawful. The suit was brought by William Draper and sixteen other jitney men. The bus owners plan to resume operations in the city at once, unless an appeal should be taken by the city. In his decision, Judge Creighton said:

"The court holds that the general subject matter of the ordinance in question is not unlawful discrimination in favor of street cars and automobiles used as ambulances, hotel

buses, sight-seeing buses, taxicabs and other classes of vehicles not embraced in said ordinance.

"The court holds that the provision in Sec. 3 of the ordinance limiting the age of one who may be granted a permit as a chauffeur to sixty years and requiring evidence of good character is unlawful and void; that the provision of Sec. 5 requiring a bond of $5,000 for the purposes therein specified, is unlawful and void; that the provision of Sec. 6, providing that a conviction for violation of the ordinance shall automatically revoke the license, is unlawful and void, and that Sec. 10 declaring the operation of any motor bus otherwise than provided in this ordinance a nuisance is unlawful and void. Complainants' motion for temporary injunction is granted."

When the ordinance to regulate the operation of jitneys was passed by the City Commission the Springfield Consolidated Railway filed action before the Illinois Public Utilities Commission asking that the jitney men be compelled to apply for a certificate of convenience and necessity. This case is still pending.

Demand That Seattle Cars Be Heated.—The City Council of Seattle, Wash., has adopted a resolution directing Corporation Counsel James A. Bradford to file a complaint with the State Public Service Commission, demanding that the Puget Sound Traction, Light & Power Company be required to heat its cars whenever the temperature on the street falls befow 40 deg. Fahr.

Extension in Buffalo Safety Appliance Case.—The International Railway, Buffalo, N. Y., has secured an order from United States Judge Hazel in Buffalo, extending the time in which to file its record on appeal from the decision of Judge Hazel, who found the company guilty of violating the federal safety appliance act by not having automatic couplers on its interurban cars.

New Jersey Bill to Regulate Jitneys. — Majority Leader Kates has introduced into the Assembly of New Jersey a bill conferring on cities the right to regulate jitneys. The measure has been referred to the committee on railroads and canals. It brings the jitneys within the meaning of the term public utility and makes them subject to the act creating the Board of Public Utility Commissioners.

Jitneys Ruled from Downtown Oakland.—In order that the safety of the public may be adequately protected and to relieve the congested condition of street traffic now existing, the ordinance governing the jitneys in Oakland Cal., has been amended so that no license for the operation of any automobile for hire as a jitney shall hereafter be granted within a defined zone which comprises the principal downtown sections of the city.

Compulsory Extension of Free Service in Toronto.—At the board of control meeting in Toronto, Ont., on Jan. 19, Mayor Church moved that an application be made to the Ontario Legislature to provide that in cities of 200,000 or more electric railways shall carry nurses, soldiers, including those in training, free of charge. He explained that in Scotland, England and Australia this was the rule. The recommendation was approved and application will be made for legislative power.

Adjusting Springfield Accident Claims.—The wreck on Jan. 10 at Springfield, Ohio, in which five persons were killed and thirty-four injured occurred on West Main Street at a grade crossing of the Springfield Railway and the Big Four Railroad. There is a double curve at this point. The power did not go off, but it is supposed that the motorman, who was killed, did not see a shifting train that was behind a through train which he let pass. The Big Four Railroad and the American Railways are co-operating in the adjustment of damages.

Settling Spokane Bridge Accident Claims.—Officials of the Washington Water Power Company and the city of Spokane, Wash., have reached an agreement whereby the former will pay one-third and the latter two-thirds of all claims for damage growing out of the collapse on Dec. 18 of the Division Street bridge and the death of five passengers in one of the two cars of the company that were on the bridge at the time of the failure. Up to Jan. 22 three claims totaling $75,000 had been settled for $19,550. On this basis it is estimated that all the total claims will be settled for about $75,000. Claims are being settled on the basis of age and earning power of the deceased or injured.

Jitney Permit Granted.—The Public Service Commission of the Second District of New York has granted a certificate of convenience and necessity under the Thompson jitney bus law to John P. Van Ostrand for that part of his route between Geneva and Rushville within the city of Geneva, subject to the terms of the local consent granted him by the city authorities of Geneva. This local consent provides that the buses shall be run only as part of the through line to Rushville and that no goods or passengers may be carried from point to point within the city of Geneva. There was no opposition to the granting of the certificate at the hearing recently held in Geneva.

Public Service Carried 413,472,702 Passengers in 1915.—During the year 1915 the Public Service Railway, Newark, N. J., carried 413,472,702 passengers. This, in spite of jitney competition in Newark, Jersey City, Hoboken and Camden, was 6,194,788 more persons than were transported the year previous. The Essex division was the banner division, with 163,716,474 passengers, and the Hudson came next, with 123,922,415. There are four other divisions of the property—Bergen, Passaic, Central and Southern. A fraction more than 22 per cent of the total represented transfer or non-revenue passengers, whereas in the Essex division nearly 27 per cent were transfer riders.

Fort Smith Jitney Ordinance Valid.—The jitney ordinance of Fort Smith was upheld by the Supreme Court on Jan. 11 when it affirmed the decision of Chancellor Falconer. The ordinance requires each operator of a jitney to give an indemnity bond in the sum of $2,500. The jitney owners sought an injunction against the enforcement of the ordinance on the ground that it was "class" legislation and also on the ground that the city commission exceeded its authority in fixing a bond, thereby creating a civil liability. The Supreme Court held that the contentions were without merit. The decision does not affect taxicab business in Fort Smith or inter-city automobile traffic.

Department of Accident Investigation in Seattle.—The title of the department heretofore known as the claim department of the Puget Sound Traction, Light & Power Company, Seattle, Wash., was changed on Jan. 1, 1916, to the department of accident investigation, the head of this department being given the title of superintendent of department of accident investigation. Effective on the same date F. M. Hamilton assumed the duties of superintendent of the above named department, replacing George Carson, resigned, as previously noted in the ELECTRIC RAILWAY JOURNAL. Mr. Hamilton reports to and receives instructions from G. A. Richardson, superintendent of railways.

Kentucky "Jim Crow" Law.—The "Jim Crow" law which State Senator Charles Knight of Louisville, Ky., stated that he would introduce, has been drafted and introduced in both houses of the State Legislature. Instead of applying only to cities of the first class, the act would require separation of the white and black races on the street cars of all cities and towns of the State. Separate cars may be provided, although fixed or movable partitions, screens or signs will meet the requirements of the measure. Chartered cars for exclusive use of patrons are not affected by the terms of the law and there are other exceptions. Violations would subject the accused to fines of from $5 to $50 and imprisonment not exceeding ten days.

Bristol Jitney Company Fails.—The Bristol Jitney Company, which has been operating for some time in the vicinity of the Tennessee-Virginia line, has gone into bankruptcy, an involuntary petition having been filed by its creditors at the instance of the company. Creditors, it is stated, will probably get less than 35 cents on the dollar. The company was incorporated last summer and for a time enjoyed a large business. It was soon discovered, a company statement notes, that the more people the jitneys hauled the more money the company lost. The fare was advanced from 5 cents to 10 cents, and people returned to the street railway. Recently creditors attached two of the company's automobiles. Efforts to reorganize and obtain more capital failed.

Jitney Defeated at Bakersfield.—The jitney was defeated at a special election held at Bakersfield, Cal., on Jan. 11.

The jitney became an election issue through the referendum of an ordinance enacted a few months ago providing only reasonable regulation of the jitneys. The jitney drivers objected particularly to the clauses which kept them one block away from Nineteenth Street for a distance of three or four blocks in the heart of the city where traffic is congested and which made them stick to their selected route throughout the day. The San Joaquin Light & Power Corporation maintains buses that transfer passengers from their terminals to residence districts and the jitneys paralleled these routes and operated only during hours when business was best.

Advertising the Floods at Louisville.—The Louisville & Southern Indiana Traction Company and the Louisville & Northern Railway & Lighting Company, cross-river lines, profited by display advertisements inserted by the companies in the papers of Louisville, Ky., during the recent flood stage of the Ohio River. These lines become especially scenic when the river gets up to the danger mark, which means that the lowlands on both sides are submerged. There are several points on the Silver Hills, near New Albany, and reached by the New Albany City line, from which great areas of flood water can be seen. "Take the Big Red Car" and "See the High Water," and "Complete Trip 20 Cents," were the items emphasized in the advertisements, which set forth the plan in detail.

Conductor Charged with Passing Imitation Coins.—Charged with filing 5 cent coins to register a cent when deposited in the fare boxes on the Buffalo city lines of the International Railway, Andrew Judge, a conductor, has been indicted by the United States Grand Jury and is under arrest for trial at the next term of court. Thomas Penny, of counsel for the company, is co-operating with the United States attorney in the prosecution of the case. The indictment charges violation of Section 168 of the United States penal code, covering the making or passing of an imitation 1, 2, 3 or 5-cent piece. The penalty on conviction is a fine of not more than $1,000 and imprisonment of not more than five years. It is alleged that in making change for passengers, Judge would give two 10-cent pieces and a filed nickel. The 5-cent piece was always deposited in the fare box by the passenger and would only register 1 cent.

Improvement in Columbus Accident Record.—The report of the safety council of the Columbus Railway, Power & Light Company, Columbus, Ohio, will show that there has been a decrease for 1915 over 1914 of 21 per cent in accidents occurring to passengers leaving cars, a decrease of 14 per cent in collisions of cars with teams, and a decrease of 36 per cent in collisions between cars. The number of automobiles in Franklin County on Jan. 1, 1916, was 9294 in comparison with 6484 on Jan. 1, 1915, or an increase of about 43 per cent, but the increase in the number of accidents due to collisions between street cars and automobiles increased by only 3 per cent. There was a slight increase in the number of accidents due to carelessness in boarding cars. People insist on boarding cars when they are moving. The number of accidents to employees shows a slight increase, from the fact that the company at the first of the year ordered that every accident, no matter how trivial, should be reported.

Interurban Character of Service Maintained in Albany.—The Public Service Commission for the Second District of New York has decided the case against the Schenectady Railway and the United Traction Company, with regard to the use of the Schenectady Railway cars for local service in Albany. The commission refused to compel the Schenectady Railway to use its interurban cars on the Albany line for local service. Inasmuch as the Schenectady Railway cars are now being used to supplement the United Traction Company's service between Watervliet Avenue and the city line the commission ordered that the schedules of these two companies be arranged so that they may furnish even intervals. The opinion is expressed that the interurban character of the Schenectady Railway service to Albany must be maintained, one reason being that the interurban cars, with their three high steps and other features unsuited to the ready ingress and egress of passengers, would tend to delay all the Albany local cars if generally engaged in local traffic.

Personal Mention

Mr. Bion J. Arnold of Chicago has been retained by the Public Service Commission of Massachusetts as consulting engineer in the Bay State Street Railway fare case.

Mr. Joseph H. Alexander, formerly chief engineer in the office of Mr. Peter Witt, who retired as street railway commissioner of Cleveland, Ohio, on Jan. 1, has entered the service of the Cleveland Railway.

Mr. Edward A. West, efficiency engineer of the Portland Railway, Light & Power Company, Portland, Ore., is spending a few weeks in Denver in efficiency work on the property of the Denver (Col.) Tramway.

Mr. Thomas A. Wallace has been appointed assistant treasurer of the Toledo Railways & Light Company, Toledo, Ohio, to succeed Mr. William P. Troth who is now in the offices of Henry L. Doherty & Company in New York.

Mr. K. D. Klemm, formerly secretary of the Kansas City, Kaw Valley & Western Railroad, who has been managing the line and handling the building of extensions, was elected president at the annual meeting on Jan. 14. Mr. E. S. Bigelow has been elected secretary and treasurer of the company.

Mr. Thomas H. Turner, who has been in the employ of the Massachusetts Northeastern Street Railway, Haverhill, Mass., for some years, has been appointed master painter, in charge of the painting of all the equipment of the company. He succeeds his brother, Richard R. Turner, who died recently.

Mr. E. W. Decker, who has been a director of the Twin City Rapid Transit Company, Minneapolis, Minn., was elected vice-president of the company at the annual meeting held in New York on Jan. 25. He succeeds Mr. Horace Lowry, who was elected president of the company. Mr. Decker is president of the Northwestern National Bank, Minneapolis.

Mr. Robert W. Boyd has been appointed secretary to Commissioner Henry W. Hodge of the Public Service Commission for the First District of New York. Mr. Boyd has been in independent consulting engineering practice in New York, and was for a time in partnership with Mr. Rudolph Miller, who resigned to become superintendent of buildings of the Borough of Manhattan.

Mr. R. H. Dalgleish, who has been in charge of the electrical department of the Capital Traction Company, Washington, D. C., for the last eight years as assistant to the chief engineer, has been appointed electrical engineer of the company. Mr. Dalgleish is president of the Capital Traction Company section of the American Electric Railway Association, just organized, and a portrait and a short biography of him appear in the department "Association News," elsewhere in this issue.

Mr. W. W. Hunzicker has resigned as equipment engineer with The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to accept a position as engineer with the Ohio Brass Company, Mansfield, Ohio. Mr. Hunzicker was graduated from Purdue University in 1908, and since that time has been actively engaged in street railway matters of a varied character. Mr. Hunzicker was employed with the South Bend, Indiana, properties during 1908-1909, Chicago Board of Supervising Engineers during 1910, and 1911-1915 in the rolling stock department of the Milwaukee properties.

Mr. John N. Shannahan, vice-president and general manager of the Newport News & Hampton Railway, Gas & Electric Company, Hampton, Va., has been admitted into the partnership of Allen & Peck, Inc. The other two members of the firm are Mr. C. Loomis Allen and Mr. E. F. Peck. Owing to the fact that Mr. Allen's duties as one of the receivers of the Empire United Railways, Inc., require practically all of his time at present, a change has been made in the work of the other partners. Mr. Peck has taken Mr. Shannahan's place at Hampton, and Mr. Shannahan spends most of his time in traveling in the interest of the firm and inspecting its different properties.

Mr. R. F. Carley, who has been appointed general superintendent of the Galesburg Railway, Lighting & Power Company, Galesburg, Ill., was born in 1885 and reared in Quincy, Ill. He was graduated from the high school at Quincy, spent two years at Leland Stanford University and two years at Cornell University, Ithaca, from which latter institution he was graduated in 1907 with the degree of mechanical engineer, having specialized in electrical work. Immediately upon graduation Mr. Carley entered the service of the McKinley syndicate at Quincy. Here he spent nearly two years learning the practical side of the operation of a public utility property, working in the car shop, at the power plant, as track foreman and as inspector of trainmen. He also aided in securing a new street railway franchise. Mr. Carley next spent more than a year as superintendent of the railway department of the Galesburg Railway & Light Company. On leaving Galesburg, he made a detailed report covering each of the various McKinley properties. This report was really a physical inventory with pictures, sketches and tabulated data covering each place. Mr. Carley next took charge of the operation of the three interurban power plants of the Illinois Traction System at Venice, Peoria and Riverton, and at the same time acted as an operating engineer for the system. Since 1912 he has been chief operating engineer located in the Peoria office. Next June will complete his ninth year of service with the company.

R. F. CARLEY

Mr. Horace Lowry, who has been vice-president of the Twin City Rapid Transit Company, Minneapolis, Minn., was elected president of the company at the annual meeting in New York on Jan. 25. He succeeds the late Calvin G. Goodrich. Horace Lowry is the only son of the late Thomas Lowry, former president and founder of the Twin City Rapid Transit Company. He was born in Minneapolis on Feb. 4, 1880. He is a graduate of the Minneapolis Emerson grade school and the Minneapolis Central High School, class of 1896, and the University of Minnesota, class of 1900, from which last he matriculated with the degree of bachelor of science. For nearly two years he was employed as an electrician in the company's shops. He then entered the auditing department. When he left the department after a year of service he was chief clerk. Mr. Lowry then retired from the company to look after his father's real estate and personal business interests, which up to that time had been in the hands of several agents. In June, 1908, he accepted the superintendency of the Minneapolis lines of the company and held that position until Dec. 10, 1910, when he resigned to give his entire time to the Arcade Investment Company, of which he is president. During that time he built the twelve-story Lowry building in St. Paul, acting as his own engineer and general contractor. On Jan. 1, 1912,, he was appointed general manager of the Twin City Rapid Transit Company and on Jan. 25, 1913, he was elected vice-president, which office he has held up to his election as president on Jan. 25, 1916. Mr. Lowry is a member of all the leading social and civic organizations of Minneapolis and St. Paul. He was married on March 18, 1909, to Kate S. Burwell and they have two sons.

HORACE LOWRY

Mr. N. B. Rhoads has resigned as general superintendent of the Southern Railway & Light Company, Natchez, Miss., to become superintendent of the railway department of the Jackson Light & Traction Company, Jackson, Miss. He succeeds Mr. F. Whitfield, who has been assigned to other duties. Mr. Rhoads was formerly manager of the Waycross Street & Suburban Railway, Waycross, Ga. He entered railway work with the Richmond (Va.) Traction Company. Later he was assistant superintendent of the Savannah (Ga.) Electric Company and then superintendent of the company. He was also superintendent of the Key West (Fla.) Electric Company and superintendent of transportation of the Beaumont (Tex.) Traction Company.

Mr. J. R. Blackhall, general manager of the Chicago & Joliet Electric Railway, Joliet, Ill., was elected president of the Illinois Electric Railways Association at the meeting held in Chicago on Jan. 21. Mr. Blackhall was born on Nov. 16, 1869, in a little French community named Caraquet, in New Brunswick, Canada. He left home when he was fifteen years old, and after working in several different places in Canada, he went to Portland, Maine, in 1889. In the spring of 1891 he entered railway work with the Woodbridge & Turner Engineering Company, New York, which had taken a sub-contract under the Thomson-Houston Company, then engaged in electrifying the Deering branch of the Portland Railroad. A few months after the Woodbridge & Turner Engineering Company completed its work at Portland the company employed Mr. Blackhall on the construction of the electric railway extending from Buffalo to Tonawanda along the lake. He was finally promoted to the position of superintendent of the road. Subsequently Mr. Blackhall served the Woodbridge & Turner Company in connection with the electrification of the horse car lines in Providence, R. I., the construction of the Westbrook branch of the Portland (Maine) Railway, the building of the Scranton-Moosic line, the electrification of the mule lines in Chester, Pa., the installation of an electric scenic line on Briganteen Island, N. Y., the electrification of the lines in Poughkeepsie, N. Y., and the construction of the independent telephone system at Mt. Vernon, N. Y. After leaving the Woodbridge & Turner Company, Mr. Blackhall constructed an overhead line connecting the new power plant with the old system in Wilkes-Barre, Pa. He next became connected with the Portland (Maine) Railroad in charge of its electrical work and remained in Portland until the spring of 1900. He then secured a position with the American Railways, Philadelphia, on work at Bridgeton, N. J. He was next sent to Joliet by the American Railways in the capacity of electrical superintendent on the rebuilding of the local lines there and the construction of the interurban line to Chicago. Upon the completion of that work he served the American Railways in other places, returning to Joliet in January, 1904, to become manager of the Chicago & Joliet Electric Railway, which position he now holds.

OBITUARY

Richard R. Turner, master painter of the Massachusetts Northeastern Street Railway, Haverhill, Mass., and member of the New England Street Railway Club, is dead. Mr. Turner was born in Providence, R. I., in 1864. He had been connected with the street railway industry for many years and had served directly under Mr. Franklin Woodman, general manager of the Massachusetts Northeastern Street Railway, for twenty-five years.

Henry Hurt, formerly president of the Capital Traction Company, Washington, D. C., and a director of several banking institutions of Washington, died on Jan. 24 at his home in Washington. Mr. Hurt, who was born in Virginia seventy-two years ago, fought with the army of the Confederacy. After the war was over he obtained work as a conductor on a horse car in Washington, D. C. In 1874 he was elected president of the Capital Traction Company. He retired from the presidency of the company in 1895, but remained a director and for the last ten years was vice-president of the company.

Construction News

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

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

FRANCHISES

Lafayette, Ind.—The franchises granted the Lafayette & Northwestern Traction Company in Tippecanoe, White, Jasper and Newton Counties expired on Jan. 1, 1916. The franchises required that the road be in operation by Jan. 1, 1916, or all rights and privileges granted under such franchises would be forfeited. The lapse of the franchises also forfeits the subsidies voted in White and Newton Counties, amounting to about $100,000. [Nov. 27, '15.]

Henderson, Ky. — Drafting of a new franchise for the Henderson Street Railway has been assigned to the railroad committee of the Council. The present franchise will expire in October. It is stated that several extensions of the system will be a part of the price of a renewed francnise.

Morganfield, Ky.—The fiscal court of Union County has issued a permit for the construction of a line between Morganfield and Uniontown, with franchise rights for fifty years. S. B. Anderson, Memphis, Tenn., and G. L. Drury, Morganfield, are interested. [Jan. 15, '16.]

Mt. Clemens, Mich.—The Detroit United Railway has submitted to the Council a proposed new twenty-year franchise. The company proposes to construct a new bridge at Macomb Street and agrees to divide the expense of a new bridge on South Gratiot Avenue, not to cost more than $15,000. It also offers to double-track South Gratiot Avenue.

Kansas City, Mo.—H. B. Pert, president of the Kansas City & Tiffany Springs Railway, has asked the Public Service Commission of Missouri for a certificate of convenience and necessity to construct a line from the north end of Swift Avenue, Kansas City, to Campbelltown, touching the main line of the Quincy, Omaha & Kansas City Railway at Campbelltown. [Jan. 15, '16.]

Pittsburgh, Pa.—An application will be made to the Public Service Commission of the Commonwealth of Pennsylvania by the Pittsburgh Railways for a certificate of public convenience for the reconstruction of the bridge over the tracks of the Western Pennsylvania Railroad on Guyasuta Road in O'Hara Township, Allegheny County. A public hearing on the application will be held at the office of the commission in Harrisburg on Jan. 31.

Dallas, Tex.—The $10,000 deposited with the city of Dallas by J. Mercer Carter and associates ten years ago to guarantee the construction within a reasonable time of interurban lines on which two franchises were granted, has been declared forfeited because construction of the lines has never been started. A third franchise which was granted at the same time has since passed into the hands of E. P. Turner, president of the Dallas Northwestern Traction Company, and has been kept alive and a similar deposit was therefore not forfeited.

Terrell, Tex.—Stone & Webster have requested the Council to extend the time on its franchise until Dec. 31, 1916, in which to begin work on the proposed Dallas-Terrell interurban line. This franchise expires on Feb. 1, 1916, unless extended or work is begun before that date. The Council took the matter under advisement but deferred taking action until a later date.

Ruston, Wash.—The Puget Sound Traction, Light & Power Company has received a franchise from the Council to construct electric transmission lines and to sell light and power to Ruston.

Seattle, Wash.—The franchise committee of the Council has denied the petition of the Puget Sound Traction, Light & Power Company to be allowed to surrender its franchise on Twenty-third Avenue from Louise to Jefferson Street, Seattle.

TRACK AND ROADWAY

Phoenix Railway Company of Arizona, Phoenix, Ariz.—This company has been granted eighteen months' time by the State Corporation Commission in which to rebuild its system.

San Diego (Cal.) Electric Railway.—Work will soon be begun by this company on the construction of an extension to La Playa, for which a franchise was granted a year ago.

Municipal Railways of San Francisco, San Francisco, Cal.—Bids for the construction of the Church Street municipal railway from Sixteenth to Eighteenth Streets and from Twenty-second to Thirtieth Streets were opened by the Board of Public Works on Jan. 17. The two lowest bids received were F. R. Ritchie, $57,276, and Western Motor Draying Company, $57,421.

Florida East Coast Railway, Jacksonville, Fla.—In addition to its regular steam service, this company has inaugurated an electric train service from Jacksonville to Pablo Beach, Atlantic Beach and Mayport.

Washington & Lincolnton Railroad, Washington, Ga.—It is reported that construction has been begun on this company's proposed line by the Morrow Construction Company from Washington to Metasville, 10 miles. M. Mason, chief engineer.

Aurora, Elgin & Chicago Railroad, Aurora, Ill.—Negotiations are pending for the purchase of the opera house block in Aurora by this company. It is reported that $60,000 was offered by the company. It is said that improvements in the waiting stations for the city lines and the third-rail line, as well as added facilities for handling freight, will follow the purchase of the property.

Joliet & Eastern Traction Company, Joliet, Ill.—Plans have been completed by this company to extend its line from Joliet to Hammond, Ind.

Central Illinois Public Service Company, Mattoon, Ill.—Work will soon be begun by this company on the construction of an extension on Vendeveer Street, Taylorville.

Illinois Traction Company, Peoria, Ill.—It is reported that this company is considering the construction of an extension from Springfield, Ill., to Hannibal, Mo., and thence to Jefferson City.

Rockford City Traction Company, Rockford, Ill.—Among the extensions contemplated by this company this year are a line to the Scandinavian cemetery; one on Whitman Street from Church Street to North Avenue and one on North Avenue to Hoffman Boulevard.

Chicago, South Bend & Northern Indiana Traction Company, South Bend, Ind.—This company has presented a plan to the St. Joseph county commissioners whereby the tracks near Osceola may be removed somewhat south and the interurban tracks be relaid directly parallel to the Lake Shore & Michigan Southern Railroad tracks. In this manner only one highway crossing between South Bend and Osceola would be needed instead of two, as at present. The proposed improvement will cost between $4,000 and $5,000. It is also said that this company may secure from the New York Central Railroad some land near Elkhart so that it may enter that city on parallel tracks with the New York Central Railroad.

Terre Haute, Indianapolis & Eastern Traction Company, Terre Haute, Ind.—It is reported that this company contemplates extending its line to Milligan Park, Crawfordsville, Ind.

Keokuk (Ia.) Electric Company.—Plans are being made by this company to extend its line from Frankford to Curryville, with possible extensions to Bowling Green on the east and Centralia on the west.

Arkansas Valley Interurban Railway, Wichita, Kan.—No new extensions are being planned by the Arkansas Valley Interurban Railway during 1916, but the company plans to improve its entire track and equipment. All worn track will be replaced and the entire line from Wichita to Hutchinson will be ballasted with sand rock, the old wooden bridges will be overhauled or replaced by concrete, the terminal facilities at Wichita will be made larger and more rolling stock purchased.

Orleans-Kenner Electric Railway, New Orleans, La.—This company plans to build a 1-mile extension to its lines.

Worcester (Mass.) Consolidated Street Railway.—Work has been begun by this company installing its feed wires in conduits on Main Street from Chandler Street to Lincoln Square.

United Light & Railways Company, Grand Rapids, Mich.—This company is preparing estimates of the cost of extensions planned during 1916.

Kansas City & Tiffany Springs Railway, Kansas City, Mo.—A report from this company states that construction will be begun about March 1 on its proposed line from Kansas City to Tiffany Springs, 15 miles. Overhead trolley will be used. No contracts are desired before March. H. G. Pert, president. [Jan. 15, '16.]

Batavia (N. Y.) Traction Company.—Stockholders in the Batavia Traction Company at the annual meeting decided not to project the line to Horseshoe Lake or any other outlying part of Batavia during the present year, as had been previously discussed.

Binghamton (N. Y.) Railway.—All of the material has been purchased by this company for an extension of its line on Conklin Avenue east from the present terminus for a distance of 5700 ft. Construction was begun last fall, but was discontinued on account of unfavorable weather conditions.

New York Municipal Railway, Brooklyn, N. Y.—Bids will be received by the Public Service Commission for the First District of New York until Feb. 10 for the construction of Section 2-A of Route 12-A, being a part of the Broadway-Fourth Avenue subway in Brooklyn, known as the Eastern Parkway subway. Work must be completed to allow the operation of trains within twenty months from the delivery of the contract, and a bond of $100,000 is required from the successful bidder.

Interborough Rapid Transit Company, New York City.—The Public Service Commission for the First District of New York has approved an agreement between the Interborough Rapid Transit Company and the New York Central Railroad for the joint use of the Putnam Division bridge over the Harlem River at Eighth Avenue and 155th Street. The approved agreement gives the Interborough Rapid Transit Company the right to extend its Sixth and Ninth Avenue elevated lines over the bridge and through 162d Street to a connection with the Jerome Avenue branch of the Lexington Avenue subway, the contract for which has also been approved by the commission. The commission has authorized the company to award construction contracts to the lowest bidders upon certain Bronx lines, as follows: For the Webster Avenue extension of the Third Avenue elevated line, to M. J. Leahy, for $831,110.90; for the Eighth Avenue and 162d Street connection, to the Battery Engineering & Construction Company, for $336,784.50; for the West Farms subway connection, to A. L. Guidone & Son, Inc., for $105,-791.

Southeastern Ohio Railway, Zanesville, Ohio.—This company, which has been organized to take over the property of the Southeastern Ohio Railway, Light & Power Company, is planning to construct various extensions.

Sapulpa & Oil Fields Railroad, Tulsa, Okla.—Construction has been completed to Shamrock on this company's proposed line from Dewey to Drumright. [Nov. 13, '16.]

Toronto, Ont.—The Etobicoke Township Council has decided to submit the hydro-radial by-law to the electors on Feb. 12. The municipality was prevented from taking a vote on the question by an order of the court owing to an error being discovered in the printing of the by-law. Toronto Township will vote on the by-law on the same day.

Northern Cambria Street Railway, Patton, Pa.—Plans are being made by this company to build an extension to Hastings. Most of the necessary right-of-way has been obtained, and it is expected that construction will be begun in the spring.

Shippensburg, Newburg & Western Railway, Shippensburg, Pa.—It is reported that this company's proposed line to connect Shippensburg, Middlespring, Newburg, McKenney and Roxbury will be built in the near future. [April 10, '15.]

Three Rivers (Que.) Traction Company.—Operation has recently been extended by this company from Three Rivers to Baptist Island.

Cleburne (Tex.) Street Railway.—It is reported that plans are being considered to improve the property of this company. The line has not been operated for more than a year and has recently been purchased by F. C. Cotton and associates of Denver. The company will be reorganized and known as the Cleburne Traction Company.

San Antonio & Austin Interurban Railway, San Antonio, Tex.—It is reported that this company will begin construction shortly on its proposed line to connect San Antonio and Austin. V. P. Brown, San Antonio, president. [Nov. 6, '15.]

Temple & Marlin Interurban Railway, Temple, Tex.—It is reported that all subscriptions for the preliminary work of this company are paid, and a survey is now being made of the proposed line. W. W. Turner, Marlin, secretary. [Dec. 4, '15.]

Tyler (Tex.) Traction Company.—It is reported that plans are being considered to extend this company's lines. The line was recently purchased by F. C. Cotton and associates of Denver, Col.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—Plans are being considered by this company for the construction of an extension of its lines from Springville to Mapleton in the near future.

Charleston-Dunbar Traction Company, Charleston, W. Va.—It is reported that plans have been made by this company to build a 20-mile extension in West Virginia.

Morgantown & Wheeling Railway, Morgantown, W. Va.—Grading has been completed by this company for its line from Price to Blacksville, and bridges have been delivered. The date of letting the contract for laying and ballasting tracks has not yet been decided upon.

SHOPS AND BUILDINGS

Pacific Electric Company, Los Angeles, Cal.—The city engineer of Los Angeles has approved the plans of the overhead structures and sheds which the Pacific Electric Company proposes to install over Los Angeles Street and at the rear of the company's Sixth Street depot, in order to relieve traffic congestion.

Illinois Traction System, Peoria, Ill.—It is reported that this company has purchased 60 acres of land on the Illinois side of the Mississippi River, just opposite Hannibal, Mo., to be used for the location of interurban shops.

Bay State Street Railway, Boston, Mass.—Plans are being made by this company to enlarge its freight house on Weir Street, Taunton.

International Railway, Buffalo, N. Y.—An agreement has been entered into between the International Railway and the city authorities of Lockport whereby the company will construct a new freight and passenger terminal in that city providing the city withdraws its objections to the one-man cars now being operated on the Lockport city lines. The Council has adopted a resolution directing the company to place two men on the city cars. The company has enjoined the city from enforcing the act and the appeal is pending in the courts.

Interborough Rapid Transit Company, New York City.—In connection with the joint use of the Putnam Division bridge over the Harlem River by the New York Central Railroad and the Interborough Rapid Transit Company, a new station will be constructed by the New York Central Railroad for the use of both companies at or near the easterly end of the bridge, which is to be the southerly terminus of the New York Central Railroad, and ultimately the present station at 155th Street, now used by the New York Central Railroad, will be abandoned.

POWER HOUSES AND SUBSTATIONS

Nashville Railway & Light Company, Nashville, Tenn.—This company plans to install a substation in the near future between the West Nashville and the West End lines in order to increase the efficiency of the railway and lighting lines.

Tyler (Tex.) Traction Company.—It is reported that this company will install new machinery in its power plant.

Manufactures and Supplies

ROLLING STOCK

Central of Florida Railway, Daytona, Fla., will probably purchase at least four new cars during 1916.

Gary, Hobart & Eastern Traction Company, Hobart, Ind., expects to purchase one combination car during 1916.

Moncton Tramways, Electric & Gas Company, Ltd., Moncton, N. B., will probably purchase four new cars during 1916.

Butte (Mont.) Electric Railway has ordered four large open cars, seating ninety persons, 30-in. wheels, from the Niles Car & Manufacturing Company.

Morris County Traction Company, Morristown, N. J., noted in the Electric Railway Journal of Jan. 22 as considering the purchase of five new cars, has ordered this equipment from the Cincinnati Car Company.

Public Service Railway, Newark, N. J., will commence building at once fifty closed cars of the same type as the sample car which was described in the Electric Railway Journal of Jan. 15, 1916, and 127 open cars of the same type as the twenty open cars built by this company during the past year. The company is also in the market for twenty interurban cars, which will be ordered from outside car builders very shortly.

TRADE NOTES

Edison Storage Battery Company, Orange, N. J., has appointed Paul Sutcliffe as advertising manager. Mr. Sutcliffe joined the Edison interests in 1912, but resigned at the end of a year to become secretary of the W. S. Hill Advertising Company, Pittsburgh, Pa. He has been in the advertising department of the Edison Storage Battery Company for the past year.

Q & C Company, New York, N. Y., announces that the "magnetic" wig-wag crossing signal, owned by the Railway Specialties Company, Los Angeles, Cal., is now, with the exception of California and Oregon, under the exclusive control of the Q & C Company, which will manufacture and sell this device both for the United States and Canada. The device will hereafter be known as the Q & C magnetic wig-wag.

Haskell & Barker Car Company, Michigan City, Ind., noted in a previous issue as having elected Edward F. Corry as president and general maanger, has also appointed the following officers: vice-presidents, C. A. Liddle and Arthur Van Brunt; treasurer, D. A. Crawford; secretary, A. J. McAllister. The main offices of the company will continue to be at Michigan City, Ind., but a sales office will be opened in the Railway Exchange, Chicago, on Feb. 1, and Messrs. Van Brun and McAllister will have headquarters at 5 Nassau Street, New York City.

ADVERTISING LITERATURE

Electrose Manufacturing Company, Brooklyn, N. Y., has issued sheets describing its insulators suitable for 1000 to 1,000,000 volts.

Southern Pine Association, New Orleans, La., has issued a number of bulletins outlining the various uses of and advantages derived from wood block for street pavement and floors of factories, foundries, machine shops, mills, warehouses, platforms, bridges and loading docks. A catalog is devoted specially to a discussion of the elimination of noise by the wood-block pavement.

Goldschmidt Thermit Company, New York City, has issued a large 1916 calendar containing a railroad map of the United States. Illustrations on the sides of the calendar show the various applications of this company's equipment and processes, such as welding for rails and other steel work and a rail grinding machine which can be easily derailed in order not to obstruct traffic.

NEW PUBLICATION

The Preservation of Structural Timber. By Howard F. Weiss. McGraw-Hill Book Company, Inc., New York. 312 pages. Cloth. $3.

As a source of reliable information of fundamental importance concerning the preservation of structural timber, this book will occupy an enviable position among civil engineers, foresters, lumbermen, students and all those interested in the subject. The various chapters treat first of the importance of wood preservation as a means of conserving timber supply, and then take up the factors causing deterioration of structural timber and the effect of preservatives on the wood. The preparation of timber for preservative treatment, the various processes and the various preservatives used for protecting wood from decay, and the construction and operation of wood preserving plants are treated both from a theoretical and practical standpoint, based upon the investigations conducted by the Forest Products Laboratory of the United States Forest Service, of which Mr. Weiss is a director. The author also discusses of the various methods employed in prolonging the lives of cross-ties, poles and cross-arms, fence posts, piling and boat timber, mine timber, paving blocks, shingles, lumber and logs. Other chapters are devoted to the protection of timber from fire and from minor destructive agents. The strength and electrolysis of treated timber and the use of substitutes are also presented in an illuminating manner. The different chapters are liberally illustrated to show the various timber destructive agents and their effect on treated and untreated timber. Various methods of seasoning and treating structural timber are also illustrated, as well as both the simple and more complicated equipment necessary to facilitate timber treatment.

JUDGE KILLITTS ON THE TOLEDO FRANCHISE

In an address before the Commerce Club at Toledo, Ohio, on Jan. 12, on the subject "The Responsibility of the Citizen Under the New Charter," Federal Judge John M. Killits declared that this charter safeguards the city against any franchise that would be oppressive or unfair to the people. The Judge said that the charter is to the city what the constitution is to the State or the nation, but it goes into many details peculiar to the city that are not touched upon by the larger political divisions. It was designed for the management of the city's affairs on business principles and its provisions are numerous to that end. In regard to the authority of the city over street railway franchise matters, through this charter, Judge Killits said:

"Under the charter no street car franchise oppressive or unfair to the people of the city can be granted, and a franchise may be drafted in a much shorter and much simpler form than was possible a month ago. The city is empowered to acquire by purchase, lease or construction any public utility and operate it.

"No franchise can be written to deprive the city from subsequently regulating and revising rates of service, nor from supervising its use and occupation of public places, nor from requiring improvements and changes in appliances, or changes in locations, manner or use of streets and public places. The right to terminate a franchise at any time is preserved and an ordinance cannot be written so as to destroy the city's power to condemn the property.

"There are many other provisions which safeguard the city and which become part of every ordinance granting a franchise, and which cannot be avoided even by the approval of the voters of a referred ordinance. The charter must be amended first before its terms can be avoided. Great care was exercised to secure to the people complete control of these matters and to make hasty and improvident legislation impossible."

On Jan. 1 the Citizens' Traction Company, Oil City, Pa., put into effect a new rate of increased wages, which places the wages of first-year men at 22 cents an hour, second-year men at 23 cents, third-year men at 24 cents, fourth-year men at 25 cents, and fifth-year men at 26 cents. The increase for first-year men is 2 cents an hour. For all of the other men the increase is 1 cent an hour.