

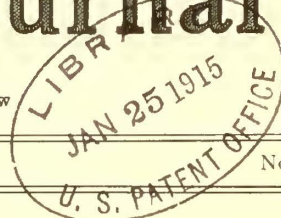
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HIGHWAY CROSSING SIGNALS

In an editorial printed in this journal last July an outline of the requirements and an analysis of the status of crossing signals were published. Since then an increasing amount of attention has been directed toward this subject. This was instanced by the exhibit at Atlantic City last autumn of several signals of this character and now by a valuable review of the entire subject, read at the last meeting of the Illinois Electric Railways Association by John Leisenring, Illinois Traction System, and republished in this issue. One reason for the growing interest in highway crossing signals is undoubtedly the recent advances made in block signals, the two kinds of equipment having many points of resemblance, both in construction and purpose. Another reason which has focused attention upon highway signals recently has been the increasing number of automobiles and motorcycles which use the highways. At the last meeting of the Railway Commissioners in Washington the committee on grade crossings called special attention to this point and pointed out that many of the drivers of these vehicles have little regard for law or custom as well as for their own safety, and incur dangers at crossings where it would seem to be a challenge to one's sanity to suggest that warning signals of any kind were necessary. If more people would follow the legal obligation to "stop, look and listen" before crossing a railroad track there would be fewer accidents, but it seems to be a modern maxim that the heedless must be protected so far as possible against their own carelessness. There would seem to be an opportunity here for an extension of the "safety first" movement to educate users of the highways as to the dangers at crossings, as well as for the inventive genius of the signal manufacturer to provide visible and audible warnings of an approaching train.

"SAFETY FIRST" SAVINGS AT MONTREAL

The "safety first" movement on electric railways is so recent that figures on its value are still difficult to obtain. Exceptional interest, therefore, pertains to two articles on this subject in recent issues of the *Montreal Gazette*. The first says that the reduction in the number of suits for damages against the Montreal Tramways since it began its campaign in the early part of 1914 has been about 50 per cent and that the amounts sued for average much less than was formerly the case. Furthermore, the company's "safety first" warnings to passengers have become so familiar to the public that there is far less inclination for plaintiffs to demand a trial by jury, because the jurors know that the company

is earnestly trying to promote better conditions. Consequently a larger proportion of cases is being settled out of court and at more reasonable figures than in the old days. This condition, our Montreal contemporary sagely remarks, may or may not be a bad thing for lawyers and court officials, but it is undoubtedly a good thing for the company and the public. The second article contains an abstract of the local coroner's report for the year 1914, according to which the number of deaths due to tramway accidents was reduced from thirty-four in 1913 to twenty in 1914. Furthermore, it is noted that all of these accidents were due to the imprudence of the victims and that verdicts of excusable homicide were returned. These splendid results were accomplished by the Montreal Tramways almost single-handed, but now the chief city engineer, the chief of police and the heads of several civic departments are co-operating with Superintendent Gaboury of the railway as a general safety committee. The Montreal Tramways is certainly to be felicitated on a showing which we hope will be repeated in hundreds of other cities.

"WITHOUT ADDITIONAL COMPENSATION"

Congressman Moon would make an earnest advocate of 3-cent fares or even of no fares at all for electric railway transportation. He has demonstrated his qualifications for leadership in such a cause in a very striking way. Those who are devoted to the national sport of getting something for nothing from railroads ought to make Mr. Moon their patron saint forthwith. For it is Mr. Moon who is the author of the amendment to the post-office appropriation bill providing a fine of \$5,000 for each and every refusal to carry the mails for whatever pay the Postmaster-General may fix. According to its author the measure (which has passed the House) provides a means whereby railroad transportation for the whole of the parcel post could be obtained "probably without any additional compensation." The railroads say that they are already underpaid \$8,000,000 for carrying the mail. An ordinary reformer would be satisfied with making the railroads carry half the parcel post free of charge, just as the ordinary reformer would be satisfied to cut fares in half. But not Mr. Moon. He would fine a railroad \$5,000 every time it refused any compensation for the whole of its transportation service that an official might fix for a part of that service. Perhaps Mr. Moon claims Biblical sanction for taking away even the half portion of mail pay which the railroads have. Thirst for the blood of the railroads has never gone farther than this. It is certainly a bad example for Congress to set for big busi-

ness and for trusts and railroads, which, we are told, are now already inclined to turn from their evil practices. But our highest financiers never conceived anything so badly unconvincing as the post-office department report showing a "surplus" of \$3,600,000 by the expedient of exacting a forced rebate of \$8,000,000 (as the railroads claim) on a transportation bill.

THE MID-YEAR MEETING

It is interesting to recall that Jan. 29, the date of the mid-year meeting at Washington this year, is practically the tenth anniversary of the important meeting held in New York on Feb. 3 and 4, 1905, at which the American Electric Railway Association decided upon its present plan of organization. It is true that the constitution was not formally adopted until the annual meeting at Philadelphia in October, 1905, but at the meeting in February, called for this purpose by W. Caryl Ely, then president of the American Street Railway Association, the general principles were determined upon. Prior to that time the present parent association and each of its affiliated associations were entirely distinct organizations with separate membership lists. Each was doing a good work, but there was some overlapping, no general headquarters and no systematic plan of organization. The inefficiency of the existing methods was apparent, and at the annual meeting in 1904 the president and executive committee were authorized to take steps to effect a more coherent and efficient body.

At the meeting in February, held at the Holland House, New York, Richard McCulloch, now vice-president United Railways of St. Louis, presented a tentative plan of organization, based somewhat upon the plan of organization of the American Association for the Advancement of Science, and contemplating a general organization and various affiliated organizations to embrace the fields of accounts, engineering and claims, the only affiliated organizations which then had been organized. The plan as a whole commended itself to those in attendance, and under the supervision of a committee which was appointed for the purpose, a constitution was drafted embodying the present plan of organization. Too much credit cannot be given to the far-seeing men who were able to foresee the advantages to the industry of an efficient national organization and who laid the foundation upon which the present structure rests.

No one who can remember the period before 1905 but must realize the great benefit to the industry accomplished by that reorganization. Much has been accomplished, but much remains to be done. Indeed, after considering the field with its ever-widening vistas of possibilities and problems, one might almost say that a beginning only had been made. There is a greater need for an association than ever before, and also a greater need for efficient work in association interests. This in the last analysis depends upon the members themselves. It is to be hoped that they will show by their attendance at the Washington meeting that they heartily support the association.

THE HEART OF THE INDUSTRY

An analysis of the 1913 and 1914 rolling stock statistics, published in our first issues of 1914 and 1915, reveals a striking proximity between the center of the purchases of this new electric railway rolling stock and the center of population in the United States, as recorded by the last census in 1910. The center of population that year was in Bloomington, Ind. An approximate calculation places the center of electric rolling stock purchases in 1913 near Dayton, Ohio, in 1914 near Lima, Ohio, only about 175 and 200 miles, respectively, from the population center. The rolling stock calculation was made by a gradual sifting-down method, similar to that used, for example, in determining the resultant of a number of forces acting in different directions. In this case, however, the product of number of cars ordered, multiplied by the distance between any two cities where the cars were put in use, was substituted for the product of the force times the distance.

Geographically speaking, this point would be the ideal position for an electric railway manufacturer to locate his plant, assuming that he enjoyed a monopoly in the line of his specialty and disregarding such place-determining factors as nearness to raw materials, labor, supplies, inequality of shipping conveniences and rates and other special facilities.

Owing to the vast agricultural areas in the West which invite interurban rather than congested city operation and thus require fewer cars, it seems unlikely that the two centers will advance much beyond the Mississippi River for some time to come, notwithstanding the fact that this dividing line is only one-third the distance across the continent.

The continuous growth of the Western section of the country has drawn the population center steadily westward for the last half century at the rate of about 40 miles every ten years. The lagging behind of the buying center is probably explained by the fact that street and interurban railways appear only in communities which have first developed a population of sufficient density to justify their existence. Conversely, in the future, a certain Eastern economic force will tend to check the western drift of both central points, this time, however, acting first on the purchasing center. The construction and extension of large subway and rapid transit systems now contemplated by the Eastern cities of Cleveland, Cincinnati, Detroit, Philadelphia and New York will require the ordering of a large amount of rolling stock in anticipation of a future increased traffic to ultimately more populated suburbs. This condition, at the time when these cars are purchased, will temporarily retard the westward movement of the purchasing center.

Somewhat later the sudden development of the new Eastern suburbs would also retard the movement of the population center. When Western cities become of sufficient size to warrant similar transit undertakings a reciprocal pull on the two points in the opposite direction may be expected.

PUBLIC CO-OPERATION AT COMMISSION HEARINGS

In presenting the side of the company at a commission hearing on service matters the representative of the railway is often at a psychological disadvantage. Ordinarily the hearing room is massed with residents of the neighborhoods most concerned looking for additional facilities of some sort or other and outnumbering the company's representation anywhere from twenty-fold to a hundredfold. The odds are against the company, whose official while on his feet must be able to meet a great variety of demands and objections, cross-questioning and assertions upon details of service with many of which no one man can be as familiar personally as the people asking the questions and presenting their views to the board. It is at once apparent that, to succeed in this difficult work, the company's representative must have the local system at his fingers' ends, must treat every inquiry with absolute frankness, admitting any lack of personal knowledge regarding events on the cars disclosed by evidence. He must also express earnest desire to investigate and remedy any conditions which indicate that the rules are being disregarded or broken by the operating department's employees, while standing firmly by the company's general position relative to the taking on of additional burdens which it feels that it cannot assume in justice to itself or to the larger community outside the immediate petitioners.

An experienced commission will make allowances for the difference in numbers, but if it is possible to supplement the company's views with evidence of a popular character against the attitude of the petitioners, a case usually may be greatly strengthened. Where the petition involves an important principle, as in the maintenance of a limited stop service in a certain district for the benefit of patrons living farther away from the business center, the bringing out of both sides by popular evidence as well as by the company's representatives is bound to be useful to the commission. There is no reason why a company should be obliged to fight its battles virtually alone before a commission when its own views on a given petition accord with the interests of perhaps thousands of its patrons who may not wish to see changes inaugurated in the service to please a relatively small number of people situated elsewhere on the system. The natural avenue of approach to this co-operation is through local business and improvement associations whose officials are men alert to grasp the facts in each case and with whom the company can work to advantage in striving to accomplish the greatest good for the greatest number. That is the policy which the modern electric railway must endeavor to realize, and, without attempting to create neighborhood dissensions or antagonism between adjacent communities, there is no reason why a company should not seek the co-operation at commission hearings of groups of patrons whose interests are identical with its own, taking care always to treat every issue frankly and to bring forward facts and figures with which to support the rebuttal to the petition.

EXPERIMENTAL SERVICE

One of the benefits of commission regulation which deserves emphasis is the facility with which experimental service may be applied in territory where traffic conditions are changing considerably from time to time. In the old days an extensive change in routes or schedules was apt to be followed by a good deal of opposition from patrons who preferred the existing order, and while others might be equally pleased with the change the modification of service was looked upon as establishing a well-fixed precedent. The result was that many rearrangements of car trips and running cards were passed by. There was a decided feeling on the part of operating men that if the company did a thing once the effect of a change would be so far-reaching that only upon the strongest reasons should a change be permitted.

To-day this attitude is much less common among transportation officials. Important changes in service are very generally submitted to the supervisory public service commission before they are inaugurated, and the probable effect of such changes upon the public convenience is often largely predetermined through the co-operation of the inspection forces of the commission and the knowledge the members of the board usually have of local situations. If there is any doubt about the expediency of a given change it is the simplest matter in the world for the commission to order it to be tried out experimentally for a short period, say from one to three months, or less in cases where the results of the change can be gaged in a lasting way sooner. The public generally appreciates that the commission is looking out for its interests. Also, the public is far less likely to assault the company through the press, via the "improvement association" route or individually, if it knows that a given alteration in schedule is made with the consent of the public authorities and that a time limit has been set upon it.

If the riders can be brought to feel that the experiment is one which the company is making on their behalf and if their interest in the result can be aroused and maintained by means of well-planned publicity, the result will be a more congenial public sentiment.

The results of the experiment reflected in a permanent change, when announced officially in the findings of the board, are also likely to be received favorably by the public at large, since it views the matter as settled by a disinterested tribunal and is precluded from entertaining the feeling that the popular side of the case has not received suitable consideration. With the increasing complexity of traffic distribution in networks resulting in no small degree from the extension of free transfer privileges, the building up of new suburban districts and the changing of the character of the old-established sections of the city, the need of changing the service even quite materially at rather short intervals is a problem of continuous importance, and the practice of having recourse to the sanction of a commission to try out such schedules as appear best adapted to the conditions is one of increasing interest.

Cleveland Railway's New Repair Shops

A Description of the New Wood-Working Shop, Erecting Shop and Paint Shop That Have Been Constructed as the First Step in a General Repair Shop Layout Which, When Completed, Will Be One of the Most Comprehensive in the Country

As a part of the general plan of rehabilitating the physical property of the Cleveland Railway Company to bring it up to a modern standard of physical excellence and thereby improve operating efficiency, a complete new general repair shop is being constructed. Approximately forty acres of land were purchased for the new shops and for a new operating station and track-department material yard, and it is estimated that the entire improvement when completed will have cost about \$1,500,000, the shop building being designed to furnish capacity for overhauling between 1500 cars and 1600 cars annually.

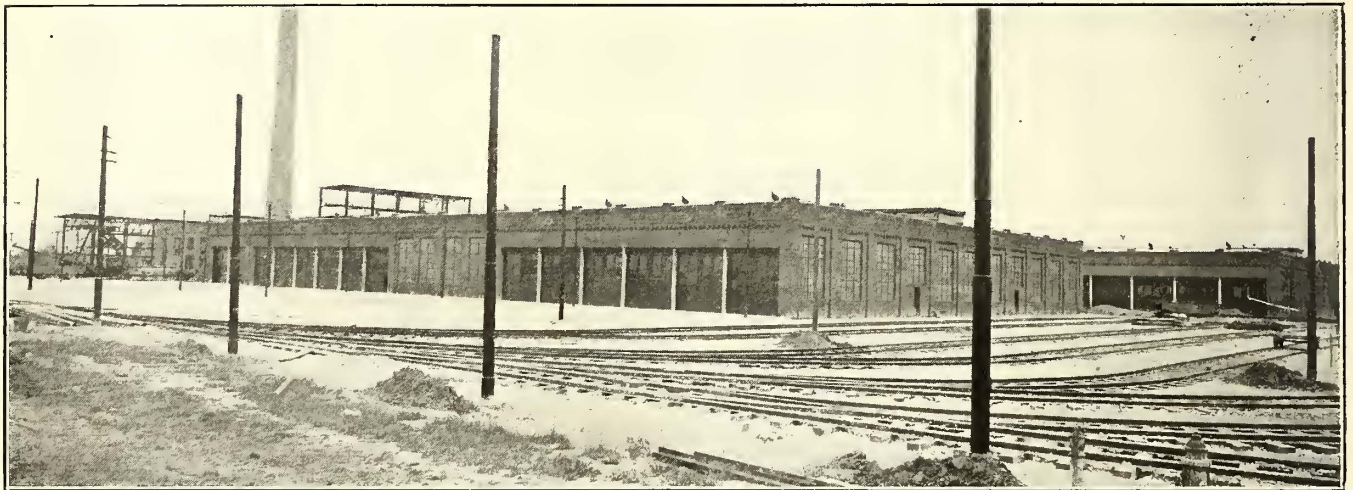
In general, the shop buildings cover an area 775 ft. x 980 ft. in dimensions, containing approximately 18 acres, or about one-half the entire property. As shown in one of the accompanying illustrations, the shop site

the entire area is filled with limestone screenings up to the tops of the rails.

SHOP BUILDING LAYOUT

In general, the shop buildings are arranged in two rows, the long transfer table pit being in the aisle between them. The transfer tables serve all the departments except the wood-working shop, which is separated from the group and is served by a transfer table and pit occupying the aisle between it and the erecting shop. A 228-ft. pit with a 25-ton transfer table is also provided at one end of the truck shop for convenience in routing work.

The shop buildings are separated transversely by the store house and boiler house into two groups. The truck, motor and blacksmith shops compose the group



CLEVELAND SHOPS—GENERAL VIEW OF SHOP BUILDINGS AND TRACK FACILITIES

is accessible to the street railway by way of several of the company's lines, the distance to the business district of the city being 4 miles. One end of the property adjoins the right-of-way of the Newburgh & South Shore Railroad, a direct steam-road connection to the Cleveland belt, which in turn handles the transfer freight business between all the steam trunk lines entering Cleveland. A track connection has been made with this line, thereby permitting the delivery of materials and equipment direct to the shops.

Excepting for a single track at the extreme south end of the property, and two at the north end, all shop tracks, of which there are thirty-five on one side and thirty-six on the other, are intersected by the main transfer table pit. This pit will be occupied by two transfer tables, one of 25-ton capacity for handling street railway equipment, and another of 75-ton capacity for shifting cars of coal and other heavy material either to the heating plant or to the various shop buildings and tracks. All tracks, both in the adjoining streets and on the property, are built of 80-lb. A. S. C. E. rail with hard-center special work at the turnouts. The tracks are laid on wooden ties with crushed-stone ballast.

In order to permit the free movement of men and equipment across the tracks outside of the buildings,

of buildings in which all iron work will be handled and running repairs made. The second group embraces the paint shop, erecting shop and wood shop, or those departments which are largely used when a general overhauling or repainting of car bodies forms a part of the repair program. The office of the master mechanic, which is in a separate building, centrally placed in the shop building group, also serves as quarters for the company's surgical department, an important part of the Cleveland Railway's welfare work.

The floor areas of the different departments and their percentages of the total area are shown in Table I.

Department	Area	Per Cent of Total Area
Truck shop	29,072 sq. ft.	10.7
Motor shop	38,456 sq. ft.	14.3
Blacksmith shop	10,221 sq. ft.	3.7
Paint shop	54,096 sq. ft.	20.1
Machine and erection shop..	62,928 sq. ft.	23.5
Wood-working shop	22,294 sq. ft.	8.3
Storehouse	51,078 sq. ft.	19.4
	<u>268,145 sq. ft.</u>	<u>100.0</u>

Reference to general data in repair shop layouts as furnished on page 540 of the April 6, 1912, ELECTRIC RAILWAY JOURNAL reveals the fact that the areas devoted to the several departments of the Cleveland shop closely approximate the average of ten existing shop layouts. As a matter of interest the table shown in that

article is reproduced in Table II and the Cleveland Railway Company's shop figures are shown below the average figures.

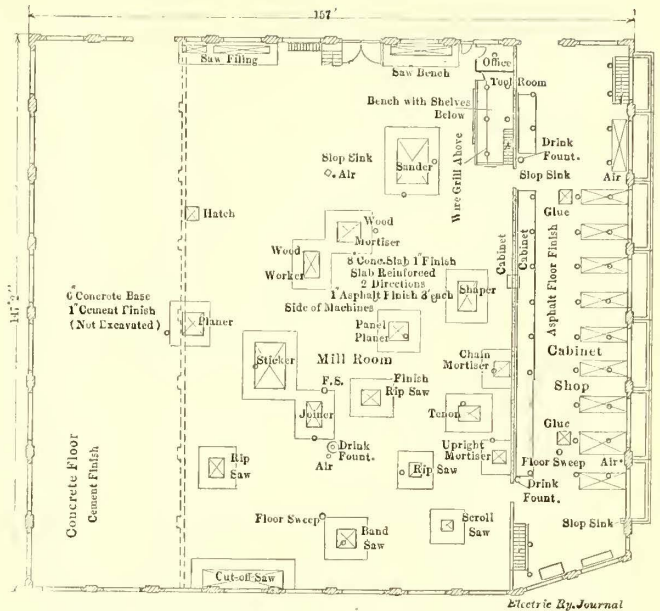
TABLE II—AREA OF DIFFERENT DEPARTMENTS EXPRESSED IN PERCENTAGE OF TOTAL SHOP AREA

	Repair Shop	Machine Shop	Blacksmith Shop	Carpenter Shop	Storeroom	Armature Room	Wood Mill	Paint Shop and Washroom
Milwaukee	19.6	12.9	5.9	18.3	13.8	5.2	6.9	17.4
Baltimore	17.9	7.4	3.7	17.9	12.4	4.8	12.8	23.1
Seattle	17.4	10.8	3.1	13.9	18.1	6.5	7.0	23.2
Rochester	21.0	13.6	3.3	10.5	30.4	3.2	5.6	13.4
Anderson	22.0	8.3	3.3	17.5	16.4	5.6	9.7	17.2
Minneapolis	9.5	8.3	7.1	17.7	17.8	8.3	8.9	22.4
Portland	19.5	8.4	6.2	10.7	11.5	8.3	7.8	27.6
Syracuse	30.2	5.5	1.5	18.7	18.5	1.5	2.4	21.7
Chicago	21.1	12.6	1.4	22.5	4.8	4.1	15.2	18.3
Montreal	23.3	8.6	4.9	19.0	10.6	4.5	7.6	20.5
Averages	20.3	9.4	4.0	16.8	14.9	5.3	8.2	21.1
Cleveland	10.7	6.0	3.7	17.5	19.4	14.3	8.3	20.1

While a discrepancy appears in the Cleveland repair-shop and armature-room percentages, the total of these two departments in the average of ten shops is 25.6 per cent, while the Cleveland total of the truck and motor shops is 25 per cent. Percentages for other departments except the storeroom, which naturally varies with conditions and the nature of the materials to be stocked, indicates that the results are quite close to the averages for the ten shops shown in the table.

CHARACTER OF BUILDINGS

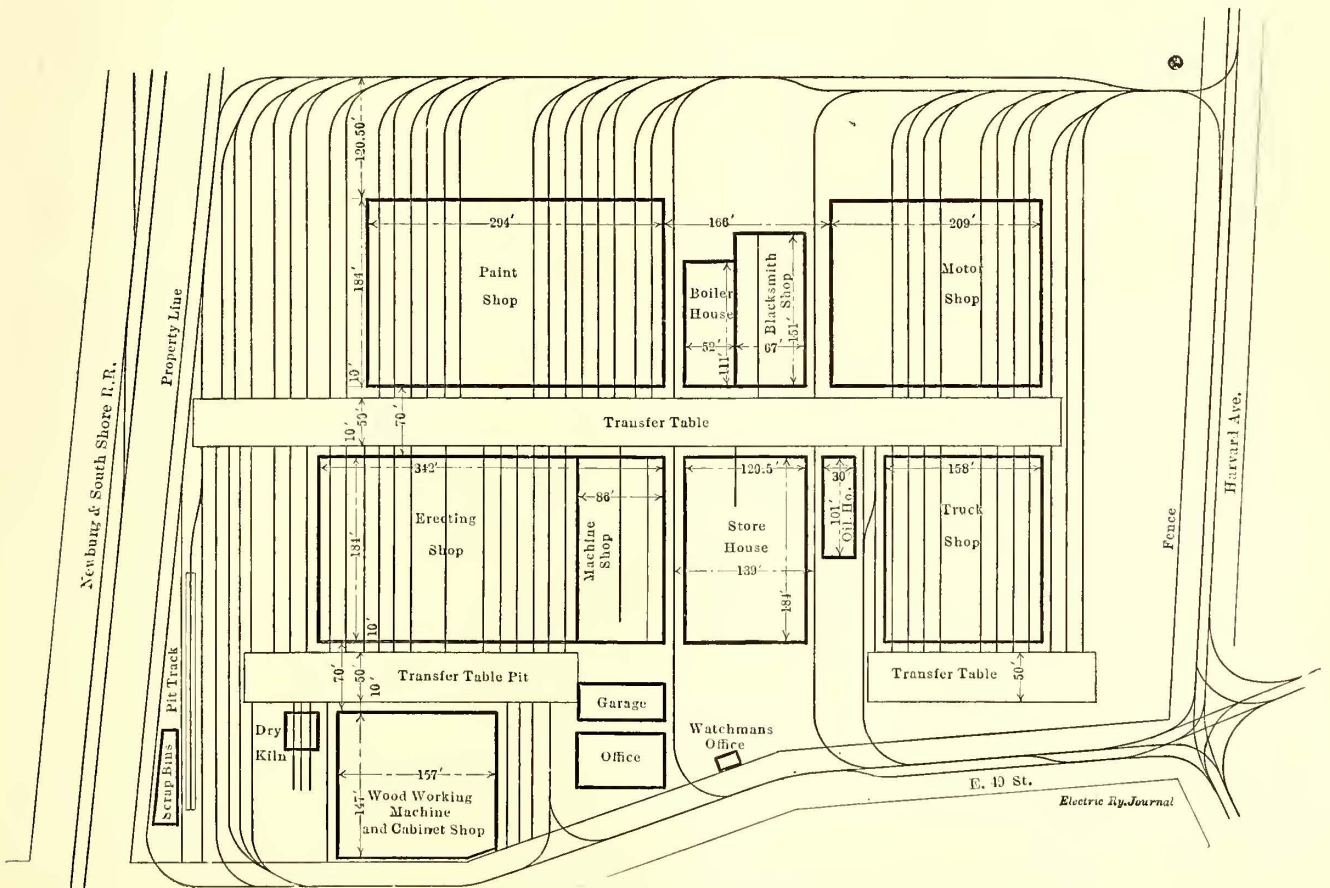
The same general architectural scheme is being followed in the new repair shop buildings as that which was adopted for the company's operating stations. The repair shop buildings, however, are of a much plainer type, conforming in appearance to the modern practice. They are constructed of brick, steel and concrete and are entirely fireproof. As shown in the accompanying illustrations, a liberal spacing of Fenestra steel sash in the



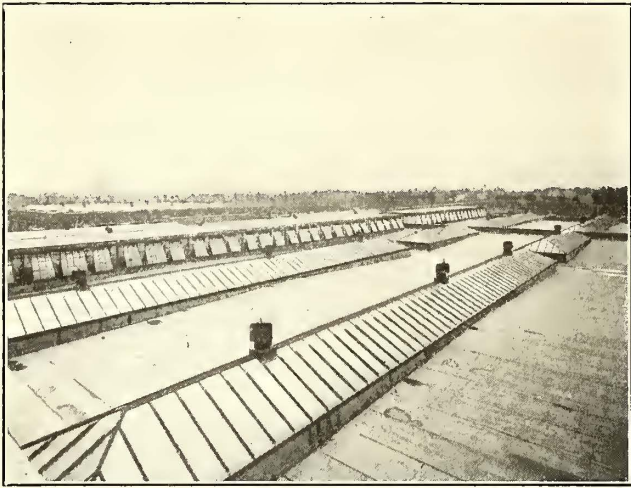
CLEVELAND SHOPS—PLAN OF WOOD-WORKING SHOP

walls and Drouvé skylights in the roof provides a practically uniform natural illumination throughout the shop-floor areas. In addition to the pivoted sash in the skylights operated by continuous mechanisms, which may be used during the warmer months of the year, Swartout rotary ball-bearing ventilators have been installed on the ridges of the skylights.

All buildings in the group are heated from the central plant by direct radiation, in the form of coils mounted on racks on the building walls or by standard cast-iron radiators. An exception, however, is made of the wood mill, which is farthest from the heating plant.



CLEVELAND SHOPS—GENERAL ARRANGEMENT OF BUILDINGS AND TRACKS



CLEVELAND SHOPS—VIEW SHOWING SKYLIGHT ARRANGEMENT

Here the direct radiation method of heating is supplemented by an auxiliary indirect system comprising a large blower and pipe coils installed on a balcony at one side of the building. As shown in one of the accompanying illustrations, in the paint shop standard cast-iron radiators are used, these being installed in the aisles between the tracks and securely anchored to the floor. This distribution of heat in the paint shop was employed to hasten the drying process of cars undergoing repainting. In connection with the heating system feed and return pipes, it is interesting to note that all pipe systems throughout the shops are painted certain colors to indicate their use. The sprinkler system is painted red, the compressed-air system blue, and the steam piping system white.

The first three buildings to be completed and occupied include the wood-working shop, the erecting shop and the paint shop, all of which are separated from each other by transfer-table pits. The wood-working shop is 147 ft. x 167 ft. in size, this area being divided into a mill room approximately 125 ft. x 147 ft. in plan, and the cabinet shop 31 ft. x 147 ft. in plan. A small tool-room and office inclosed in a sheet-steel and wire-mesh partition occupies one corner of the millroom. A gallery extending approximately the full width of the mill-

room serves for the employees' locker room and lunch-room, and toilet facilities. One end of this gallery is also occupied by the templet room, and adjoining it is the space provided for the indirect radiation auxiliary heating system. The equipment in the cabinet shop consists principally of benches and facilities for gluing and finishing cabinet work. By separating the cabinet shop from the millroom, it is kept free from the dust and dirt incident to the use of wood-working machinery.

The floor construction in the wood-working shop, as well as in the other shop buildings, is somewhat unusual, being a combination of concrete, wooden block and asphaltum. In the millroom each wood-working machine is surrounded with an asphalt-finished floor extending 3 ft. out from all sides. The remainder of the floor is of reinforced concrete with a sidewalk finish, the idea in employing this construction being that the concrete aisles would furnish a smoother surface for trucking and handling materials to the various wood-working machine tools, while the asphalt slabs surrounding each machine would make them more comfortable for the operators. In the cabinet shop and on the balcony the entire floor is surfaced with a 1-in. asphalt finish, since the trucking and handling of heavy materials over these floors will occur only on rare occasions.

All wood-working machine tools are driven from motors in the basement below the millroom, where also are installed the conduit carrying the power circuits to the various tools, the main and return pipes in the heating system and the shaving and refuse exhaust system. A single track enters the wood-working shop from the transfer table beside it. The center of this track is parallel to the millroom wall opposite the cabinet-shop partition, and it is planned to use the 32-ft. aisle between this track and the building wall for the storage of lumber.

ERECTING SHOP ARRANGEMENT

Across the transfer-table pit from the wood-working shop is the combination erecting and machine-shop building. This is the largest building in the shop group, as it is 184 ft. x 342 ft. in dimensions. The area is divided into three rooms, of which two compose the erecting shop, one being for taking care of light body repairs which cannot be done at the operating stations, and the other being for general overhauling purposes. The third room is set aside for the machine shop. The



CLEVELAND SHOPS—INTERIOR VIEW OF PAINT SHOP

light-repair section is 102 ft. wide by 184 ft. long and contains six tracks. Two of these tracks are constructed with inspection and repair pits extending the full length of the building, except for 6-ft. aisles at each end. The tracks in this section are spaced at 16-ft. centers, and the floor area is clear except for a single row of columns down the center aisle.

The erecting shop proper is 152 ft. 6 in. wide by 184 ft. long and is served by seven tracks extending entirely through the building. Six of these tracks are on 16-ft. centers and the seventh passes through the center of a 51-ft. aisle which is set aside for the storage, cleaning and repairing of sashes, doors and seats. The space allotted for storage and the various light-repair operations has been carefully laid out. Equipment in this portion of the general erecting shop largely includes wood benches in sizes which will best accommodate the work to be handled on them. Inclosed in brick partition walls at one end of this space is the varnish-remover room. Beside it, in sheet-steel and wire-mesh partitions, are a small storeroom and office. On a balcony above the storeroom and office, and also extending over a portion of the sash, door and seat-repair floor, is the lunch and locker room, and employees' toilet facilities.

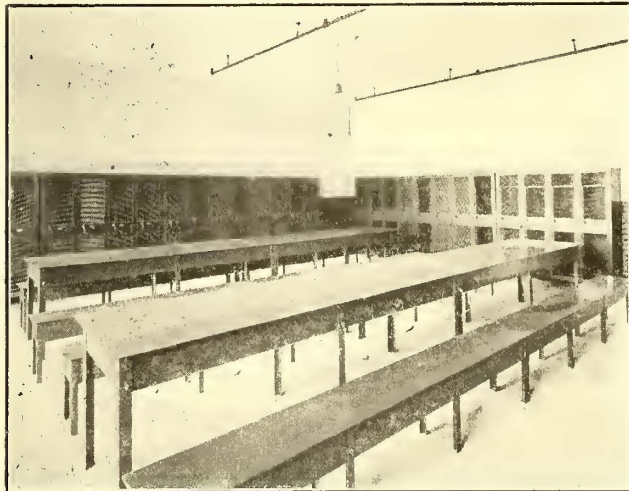
The floors in the intermediate or general overhauling

by a jib crane. A rather unique feature in connection with the crane installation is the special traveling jib crane, which serves the wheel press and a lathe. This is mounted on the partition wall between the machine and erecting shop and has a traveling range sufficient to permit it to serve both tools. By the use of the traveling jib crane it was possible to avoid columns in the space between the wheel press and lathe and the track, and at the same time one crane serves both tools.

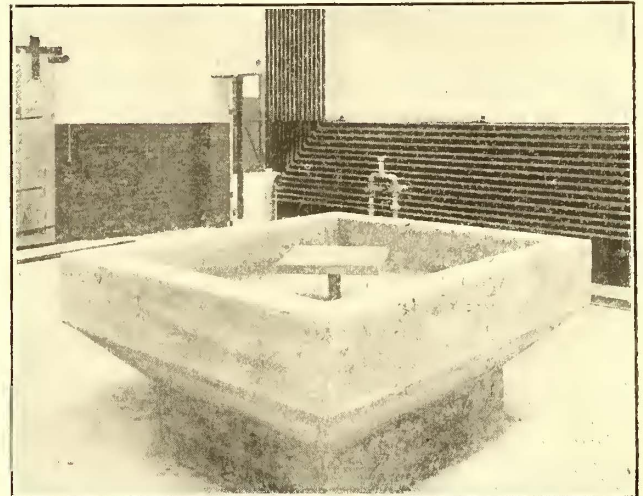
The overhead traveling crane in the machine-shop section spans the entire width of the building, and, therefore, serves both the first floor and the gallery. Ample vertical clearance in the machine shop has been provided by increasing the height of this section of the building, so that the distance between the underside of the roof and the floor is approximately 45 ft. This provides a clearance between the crane rail and the floor line of 21 ft. 8½ in. As in the wood-working shop there is also a basement in the machine shop, so that all machine tools can be equipped with underdrive motors.

PAINT-SHOP LAYOUT

The third building in the general shop layout that is at present completed and ready for occupancy is the paint shop, which is just across the transfer-table pit



CLEVELAND SHOPS—INTERIOR VIEW OF LUNCH AND LOCKER ROOM



CLEVELAND SHOPS—VIEW OF CONCRETE SINK FOR WASHING SASH

sections of the erection shop are of concrete with a sidewalk finish of cement, while those in the storage and repair department are creosoted wood block, except in the aisle occupied by the track entering this department and in the transverse passageways between the two erecting shop sections. Wood block was employed because a resilient floor was desired, and it was believed that asphaltum would not stand up under the rough usage common to the work to which this space was devoted.

A machine shop 86 ft. 9 in. wide by 184 ft. long forms the third section in the erection-shop building. A single track passes down the center of this shop from the transfer table between the erection shop and the paint shop. The heavy machine tools, embracing the wheel lathes, presses and boring mills occupy the space on each side of this track. The machine tools for handling the lighter work are installed on a balcony 15½ ft. wide and occupying one side and one end of the machine shop. A portion of this balcony at one end is utilized for the employees' quarters.

In order to facilitate the work of handling heavy repair parts, the machine shop is served by an overhead traveling Toledo crane of 5-ton capacity, and in addition each machine tool handling heavy parts is served

from the erecting shop. In plan the paint shop is 184 ft. x 294 ft., and this area is divided into three sections—two for use in painting cars and a third for car washing. Fourteen tracks on 16-ft. centers pass through this building, six through each of the two paint-shop sections and two through the washroom. The paint shop proper is arranged somewhat like the erecting shop, having an area embracing six tracks on either side of a 50-ft. aisle where miscellaneous parts such as signs, fenders and sashes are cleaned and painted. One end of this aisle is occupied by a paint-mixing room, which is inclosed in brick firewalls, and there is also a storeroom and a small office. Above these is a balcony occupied by the employees' quarters.

Concrete floors have been provided throughout the paint shop, and these, like the firewall and metal-clad doors between the two paint-shop sections, effect a reduction in the insurance rate. Although the buildings are built almost exclusively of concrete, steel and brick, sprinkler systems are provided in all the shop buildings and these also effect a substantial reduction in the insurance rate. All lunchrooms and locker rooms are fitted with steel furniture. Sanitary drinking fountains have been installed throughout all of the buildings.

A rather unique feature in the paint-shop building is

the concrete sash-scrubbing basins, of which there are two. One of these basins is shown in one of the accompanying illustrations, and it will be seen that it is of a rectangular section and provided with a small pivoted wooden platform in the center. Sashes are laid on this small platform and a goose-neck shower fixture, extending above from the pipe connection, serves to spray hot water over them.

The importance of these shops and their many interesting and ingenious details make them worthy of extended description, and a later article will include an account of the remainder of the buildings and of the many unique labor-saving devices which have been installed in the various departments. The design and general layout were in the hands of Morrow & Cross, civil and architectural engineers of Cleveland, under the supervision of Terrance Scullin, master mechanic Cleveland Railway. All of the buildings but not the tracks were constructed by W. I. Thompson & Son Company, general building contractors, of Cleveland.

One Year of Baltimore's Pension System

President House Sends Personal New Year's Letter to the Pensioners, Accompanied by a Framed Service Certificate and a Pass Book

In January, 1914, the United Railways & Electric Company of Baltimore inaugurated a pension system, under which employees who have rendered long and faithful service are retired after having reached an age necessitating relief from duty, or when through physical disability they are unable to perform the duties of their position. The plan is as follows:

All employees, other than those on salary, are subject to the following pension provisions:

Those who have attained the age of seventy years, whether incapacitated or not.

Any employee sixty-five to sixty-nine years of age who has become incapacitated.

Any employee who has not reached the age of sixty-five, but who has been in continuous service for at least thirty years, and who has become incapacitated, may be retired with the amount of pension as fixed in paragraphs (c) or (d) below.

Any employee after twenty years of continuous service if physically or mentally disabled in the company's service.

The pension allowances are as follows:

(a) If in continuous service twenty years and less than twenty-five years, 30 per cent of the average monthly wage received during the ten years immediately preceding retirement.

(b) If in continuous service twenty-five years and less than thirty years, 35 per cent of the average monthly wage received during the ten years immediately preceding retirement.

(c) If in continuous service thirty years and less than thirty-five years, 40 per cent of the average monthly wage received during the ten years immediately preceding retirement.

(d) If in continuous service thirty-five years or more, 50 per cent of the average monthly wage received during the ten years immediately preceding retirement.

The entire expense is borne by the company, and the announcement of the system evoked most favorable comment from the press, as well as from the company's employees. As is well known, a pension system obviously tends to encourage employees to remain in the service long enough to develop capacity and acquire experience. The resulting efficiency is reflected in the service afforded and is, therefore, of direct interest to the riding public.

It was determined after inaugurating the pension plan

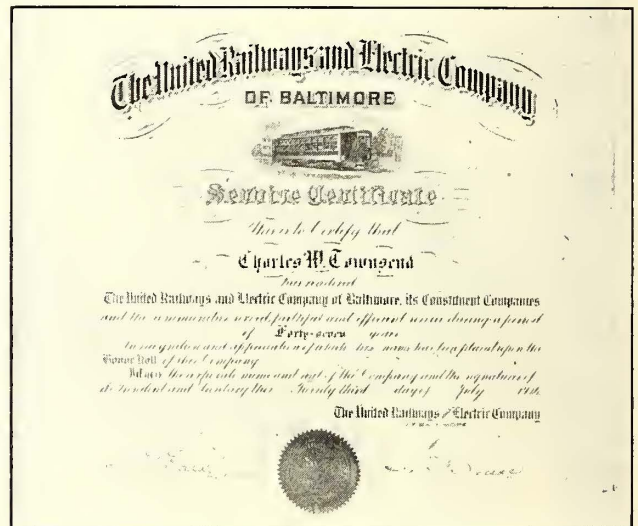
to spare no pains or expense in providing a certificate of service to be presented to each retired employee placed upon the company's honor roll. The company has succeeded in devising what it believes to be one of the most attractive that has come under its observation. The accompanying cut shows one of these service certificates, but unfortunately a reproduction cannot bring out the full beauties of the original.

The courtesy of free travel over the lines of the company's system has also been extended to these honor men, with an invitation to make liberal use of the privilege and to bear in mind that they were still considered "one of the family."

After a successful operation of the pension system for one year, a suitably framed pension certificate of the character named, together with pass book and the following individual letter, was delivered at the home of each retired employee:

"At the close of the first year of the company's pension system, it would seem but proper to hand to each man who is enrolled upon the list of honor a testimonial in recognition of the long, faithful and valuable services rendered.

"In all my official connection with the company, no action taken by the board of directors has given me



FORM OF SERVICE TICKET PRESENTED TO ALL PENSIONERS OF THE COMPANY

greater pleasure than the inauguration on Jan. 1, 1914, of this pension system.

"While unable to engage actively in the work to which you have heretofore been assigned, we still feel that you are one of us and interested in the success and prosperity of the company. It is with much gratification, therefore, that I am handing you a pension certificate in your name, suitably framed, evidencing to yourself, family and friends your efficiency and loyalty to the interests of the company you have served, as well as a book of travel for your use at such times as you may find it necessary to use the lines of the company's system, renewable when coupons are exhausted.

"Hoping the New Year may have in store for you and those dear to you many good things, and expressing the fullest appreciation of your services, believe me,

"Very sincerely,

"Wm. A. House, President."

One of the men, Charles W. Townsend, whose certificate is the one reproduced, was in active service forty-seven years, having been retired in July, 1914.

It has been a source of much gratification to President House to learn of the appreciative and cordial manner in which the men received their certificates, trans-

portation and New Year greetings from the management. In most part they were deeply affected and were unable, because of emotion, to express their appreciation of the honor bestowed upon them. One old section foreman referred with pride to his record of always looking after the company's interests in seeing that all replaced material, such as bolts, nuts, plates, etc., was carefully gathered up and forwarded to the scrap pile. The management feels rightly that such loyalty cannot be purchased, and that in honoring men of that caliber the company is honoring itself.

Winter Meeting of the Illinois Electric Railways Association

The Meeting Was Devoted to the Presentation and Discussion of Committee Reports—F. E. Fisher, Joliet, Was Elected President

The Illinois Electric Railways Association met in Chicago on Jan. 15. Nearly 100 members and guests discussed the committee reports and were entertained at luncheon. The chief features of the meeting were discussions of the reports of the traffic committee on a state interurban map, and of the block signal committee on highway crossing protection, which was illustrated.

After President B. I. Budd had outlined briefly the work which the executive committee had carried on during the past year, Frank E. Johnson, Ohio Brass Company, chairman of the membership committee, reported that all the roads in the State except four were now members of the association. Ten had joined during the year. The report of the traffic committee, prepared by Richard Breckinridge, Aurora, Elgin & Chicago Railroad, was next read. This had to do with interchangeable coupon mileage books. In the discussion T. W. Gregory, East St. Louis & Suburban Railway, asked for a committee discussion on how the 2-cent fare law would affect the method of collection for local stops. The law just states that 2 cents per mile may be collected, but does not provide for cross-country "convenience" stops.

COMPANY SECTIONS

President Budd, in acknowledging the report of the program committee presented by Chester Willoughby, Illinois Traction System, spoke of the value of company sections of the American Electric Railway Association. He said that following a paper on company sections presented at an earlier meeting of the Illinois association, the Chicago Elevated Railways had formed a company section which since had held two successful meetings. He was now certain that this section would be valuable to the individuals participating in its programs and to the railway companies.

STATE INTERURBAN MAP

Eugene E. Soules, Illinois Traction System, reported for the publicity committee and displayed several maps that had been made ready for final correction and approval by the association. The committee had considered plans for three maps: (1) A small map showing the State outline and the properties therein, including member and non-member companies. This map was designed for printing on the backs of letterheads of all companies. (2) A map 30 in. x 18 in., to include the steam railroads and packet lines offering connections with the interurban lines. (3) A map approximately 36 in. x 50 in. for advertising purposes, to be printed in three colors and to show all steam and electric railroads. The association instructed the committee to proceed with the execution of the work and to have the master plates ready at the earliest possible moment.

The publicity committee also reported that the Chicago Elevated Railways, acting as a central information

bureau for the interurban lines of the State, had, during the summer, distributed on the elevated railway platforms the folders and other publicity literature of nine separate railways. The committee suggested a joint publicity booklet for all association roads and mentioned the desirability of a central information bureau in Chicago at a location such as the Fifth Avenue terminal of the Aurora, Elgin & Chicago Railroad.

ELECTIONS AND COMMITTEE APPOINTMENTS

The following were unanimously elected to the positions named: President, F. E. Fisher, general superintendent Chicago, Ottawa & Peoria Railway; first vice-president, J. R. Blackhall, general manager Chicago & Joliet Electric Railway; second vice-president, A. J. Purrinton, general superintendent East St. Louis & Suburban Railway; executive committee, B. I. Budd, president Chicago Elevated Railways, chairman; E. C. Faber, second vice-president and general manager Aurora, Elgin & Chicago Railroad; H. E. Chubbuck, vice-president executive Illinois Traction System; W. C. Sparks, general manager Rockford & Interurban Railway; Frank J. Baker, vice-president Middle West Utilities Company, and C. F. Handshy, assistant general manager Illinois Traction System.

President-elect Fisher appointed the following committees to act during 1915: Membership—Frank E. Johnson, Ohio Brass Company, chairman; W. M. Brown, Central Illinois Traction Company; Ralph G. Arnold, Elgin & Belvidere Electric Company. Traffic—Richard Breckinridge, general freight and passenger agent Aurora, Elgin & Chicago Railroad, chairman; C. C. Shockley, general freight and passenger agent Rockford & Interurban Railway; W. P. Patten, Illinois Traction System; A. M. Farrell, chief clerk traffic department Chicago, Ottawa & Peoria Railway; T. W. Gregory, general passenger agent East St. Louis & Suburban Railway. Signals—John Leisenring, signal engineer Illinois Traction System, chairman; E. F. Gould, electrical and mechanical engineer Aurora, Elgin & Chicago Railroad; W. F. Carr, engineer maintenance of way and overhead construction Chicago, Ottawa & Peoria Railway; B. J. Fallon, engineer maintenance of way Metropolitan West Side Elevated Railway; G. T. Seely, assistant general manager Chicago Elevated Railways; L. E. Gould, western manager ELECTRIC RAILWAY JOURNAL. Program—W. V. Griffin, secretary and treasurer Chicago Elevated Railways, chairman; Dr. H. E. Fisher, Chicago Elevated Railways; Miles B. Lambert, Westinghouse Electric & Manufacturing Company; H. J. Kenfield, president *Electric Traction*; L. E. Gould, western manager ELECTRIC RAILWAY JOURNAL. Publicity—E. E. Soules, manager publicity and advertising Illinois Traction System, chairman; W. H. Heun, superintendent of transportation and claim agent Chicago & Joliet Electric Railway; C. E. Patten, general agent Chicago Elevated Railways; J. M. Strasser, vice-president Illinois Light & Traction Company; Thomas J. Dawson, attorney.

HIGHWAY CROSSING PROTECTION

John Leisenring, Illinois Traction System, chairman of the block signal committee, presented the report of the committee on highway-crossing protection. An abstract of the report will be found elsewhere in this issue. He stated that Carl P. Nachod had prepared for the committee a treatise on the fundamentals of highway-crossing alarms and their control, which was available for the use of the member companies on requisition to Mr. Leisenring. In the discussion after the report some of the features brought out were the need for more uniformity in aspects, and the desirability of more study of the need for a tell-tale indication to inform the motor-man of an approaching car whether or not the highway-crossing signal was operating properly.

Highway-Crossing Protection

Abstract of the Report of the Block Signal Committee of the Illinois Electric Railways Association
Presented at the Meeting in Chicago on Jan. 15

At the winter meeting of the Illinois Electric Railways Association John Leisenring, chairman of the block signal committee, presented an exhaustive report on highway-crossing protection. After outlining briefly the general situation the report gave the results of observations, made by a number of steam railroads, of the extent to which pedestrians and drivers take precautions for their own safety when about to cross tracks. The report then described and illustrated the available crossing signals and protecting gates and gave data on their installation, operating and maintenance costs. Data as to the present practice of the member companies in highway crossing protection were given in conclusion. The following paragraphs contain abstracts and paraphrases of much of the report.

In 1874 the Illinois Legislature first ordered the erection of highway-crossing warning signs. On Oct. 4, 1913, the Governor held an executive conference with officers of steam and electric railways of the State to plan for co-operation of railway, State, county and township authorities in minimizing grade-crossing hazards. Laws have been passed in several states requiring protection of railway crossings over state-aided highways. In Canada the railway commissioners have for five years had authority to draw upon a fund of \$200,000 per year for the abolition of grade-crossing hazards and have issued 161 orders for bells, sixty-eight for gates, sixty for subways and bridges, fourteen for highway diversion and two for highway closing.

STEAM RAILWAY METHODS AND EXPERIENCES

The Chicago & Northwestern Railway is erecting at all dangerous and obscure highway crossings additional crossing signs 400 ft. from the track, for the purpose of giving advance warning. The company's safety bulletin requests suggestions from employees as to crossings at which such signs should be erected. In 1913 and 1914 the Southern Pacific Company made observation tests at crossings in widely-separated localities in Nevada, California and Oregon with the results shown in the accompanying table. After the first tests had been made a campaign of publicity was started in every town traversed by the line, and in this campaign the figures obtained by the test were employed to excellent advantage. Literature of the warning sort was distributed very thoroughly, and the railroad employees were requested to report instances of carelessness on the part of automobile and motorcycle drivers, together with license numbers, to their superintendents. Superintendents had been provided with copies of the State automobile registration lists and took up the individual cases of carelessness with telling effect. The campaign was carried into the schools by division officials. To determine the effect of this campaign, observation checks were made at the same crossings eight months after the original tests were made, with the result indicated in the table.

Tests made by the Illinois Central Railway show that more than 75 per cent of the people passing over crossings at congested points pay little or no attention to the approach of trains. In this connection the chairman of the general safety committee of this road states that he believes a great many people depend on their hearing rather than on their eyesight to detect the approach of trains.

Investigation made by the Pennsylvania Railroad and by the New York Central lines show that about 5 per cent of the persons using the crossings stop, look and listen, while the results obtained by the Baltimore & Ohio Railroad in a total of nearly 30,000 observations were as follows: Nine-tenths of 1 per cent stopped and looked in both directions, 14.9 per cent kept moving and looked in both directions, 26.9 per cent kept moving and looked one way only, and 57.3 per cent kept moving and looked straight ahead. The observations of the Southern Pacific, before that road's campaign of publicity, showed that almost exactly the same percentages hold for those who stopped and looked in both directions and those who kept moving and looked straight ahead. After the Southern Pacific educational campaign this latter percentage was reduced from 58 to 27, that is, half of the people who previously paid no attention to the condition of the track later stopped, looked or listened.

PROTECTIVE METHODS

The protective methods that may be followed in making a crossing more safe for the passage of trains and highway traffic involve the following fundamentals:

Kinds of Protection

Improvement of physical conditions surrounding crossings: Grade separation; realignment of highway to give better vision; reduction of time vehicles are on crossings and decrease of installation and maintenance costs; removal of obstructions to view of approaching trains, such as hedges, brush, trees, buildings, fences, billboards and embankments; improvement of highway profile.

Installation of protective apparatus: Barriers, i.e., gates and watchmen; signals, i.e., signs and alarms.

As the methods for improving the physical conditions surrounding crossings are so well known the subjects of crossing alarms and barriers are taken up directly.

HIGHWAY CROSSING SIGNALS

An editorial in the ELECTRIC RAILWAY JOURNAL of July 11, 1914, presented some of the fundamentals controlling the choice and installation of highway crossing protection systems. Highway crossing signals perform two functions; they designate the location of crossings and announce the approach of trains to the crossings. A simple form of signal for informing the traveler on the highway that he is approaching a railroad intersection is the old-fashioned "stop, look, listen" signboard.

REPORTS OF SOUTHERN PACIFIC COMPANY'S OBSERVATIONS AT HIGHWAY CROSSINGS

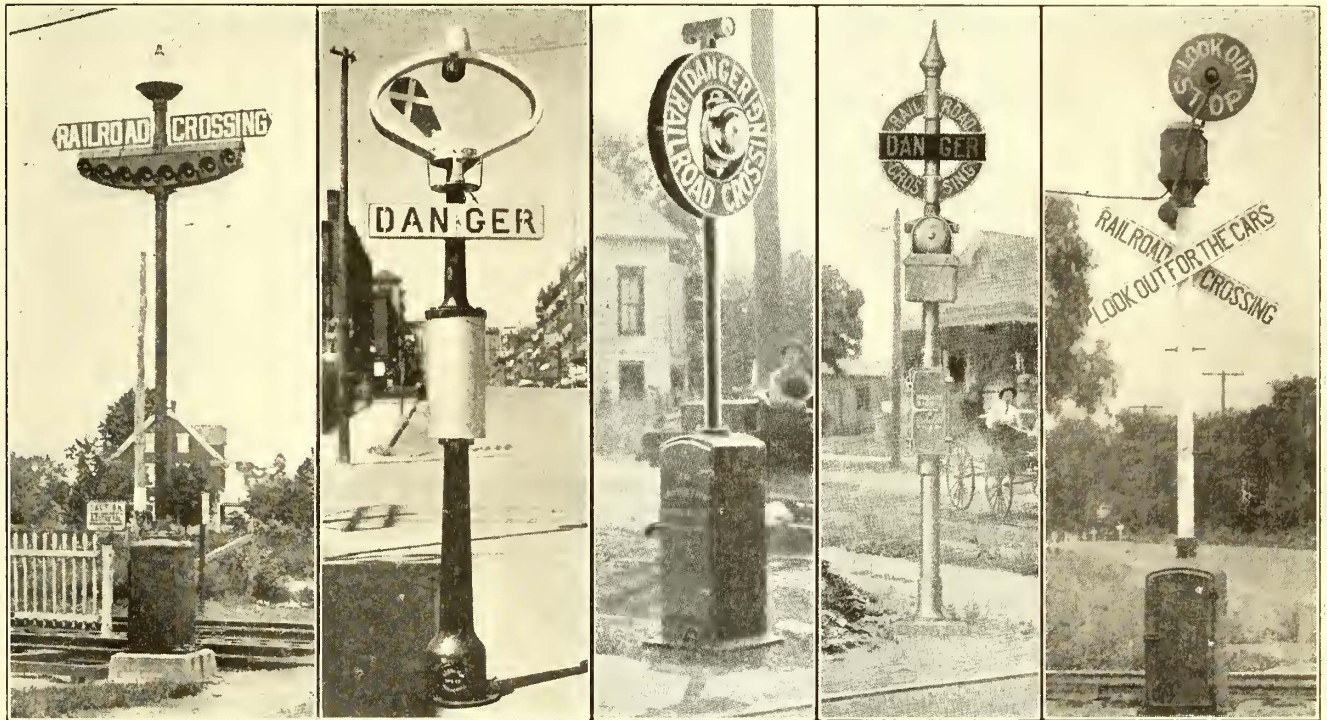
Actions of Pedestrians or Drivers	Automobiles				Teams				Pedestrians				Total			
	1913		1914		1913		1914		1913		1914		1913		1914	
Previous to Crossing Tracks	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
Stopped and looked in both directions.....	35	1	139	1	2,546	52	9,171	52	2,268	36	35,569	65	9,548	34	53,141	60
Kept moving and looked in both directions.....	4,734	28	8,401	51	417	8	2,595	14	951	15	5,680	10	1,784	6	10,530	12
Kept moving and looked one way only.....	416	2	2,255	14	1,926	40	5,989	34	3,082	49	13,586	25	16,844	59	25,261	28
Kept moving and looked neither way.....	11,836	70	5,686	35	.....	.....	.....	.....	.....	.....	.....	.....	3,301	..	446	..
Ran over crossing at reckless rate of speed	3,301	19	446	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total.....	17,021		16,481		4,889		17,755		6,301		54,835		28,211		89,072	

Somewhat similar boards are now being used as distance signals for crossing bells. The announcing of an oncoming train is more difficult of performance. Among the more common types now available for installation on electric railways are the simple illuminated crossing sign, the intermittently illuminated sign which gives repeated flashes of light, the signal with moving parts imitating the waving or swinging of a red blade or flag, and various combinations of these aspects, all designed to be arrestive. Combined with these visible indications are audible indications such as bells, gongs and sirens.

The prime requisite in a highway-crossing signal is reliability. The signal should be so controlled that the train, passing certain limits by virtue of being within a

in which are connected interlocking relays that in turn energize the crossing bells and lamps whenever a car is passing through or standing within the block.

A second feature of importance in highway-crossing protective apparatus is continuity of signaling. For example, if more than one train should enter the ringing limits at one time and, later, one should pass out or both stop for some time and then proceed across the highway, the signal must warn against the last as well as the first crossing. Thus car-counting devices are an important feature in the intermittent scheme of control. It is important to so arrange the device that if several cars are near the crossing simultaneously, the bell will continue ringing as long as there is one car inside the



HIGHWAY CROSSING PROTECTION—TYPICAL CROSSING SIGNALS

From Left to Right—Brach Automatic Flagman, Hoeschen Magneto-Mechanical Signal, Protective Oscillator Signal, Nachod Flashlight and Bell Signal, and Railway Specialties Company's Wigwag Signal

certain section, will cause itself to be announced at the crossing. There are two forms of such control, intermittent and continuous.

With the intermittent control the electrical signal release is actuated either by the passage of the car wheels or the trolley wheel past some setting device. One car-wheel type of control is the old-style steam-railroad-track instrument, a short insulated-track section or a contact bar placed adjacent to the rail and so located that the flange or tread of the wheel will touch it. Another successful type is that in which the control is obtained by the movement of the rail, which in one make of signal is mechanically multiplied and drives a small generator, which in turn supplies an electrical impulse to release the bell. In another type the movement of the rails opens or closes balanced contacts attached to the base or side of the rail. By each of these intermittent-control devices the highway-crossing signal is started and stopped by the passage of any car, whether it is a motor or not.

The second and very common form of intermittent control, i.e., the trolley-contactor type, is obtained by the trolley wheel passing along the wire, the wheel either mechanically throwing a switch or electrically making a contact.

Contrasted with these intermittent forms of control is the continuous control obtained with track circuits,

control zone. The continuous track circuit performs this function in the ideal way, but is little used on an electric railway because of its high first cost. With trolley-contact and mechanical-rail controls continuity may be approached by placing extra contactors or restarters between the first starter and the crossing. When trains entering the protected zone do not proceed directly over the crossing, devices have been installed so that the bell will stop ringing after a predetermined time. An additional instrument or contact insures that, in a case of this kind, warning will be given when the train again proceeds. This feature makes possible the use of bells near residences where they might otherwise be objectionable.

TYPES AND COSTS OF CROSSING ALARMS

As there is such a wide variety of crossing alarms, all available for use on electric railways, brief descriptions of the various types will be presented. Space and time limit the descriptions to the chief characteristics of each type mentioned, the principal features being the method of control, the kind of indication given and the method of giving the indication.

The following manufacturers supplied the committee with information about their crossing signals designed for and now in use on electric railways: L. S. Brach Supply Company; Hoeschen Manufacturing Company;

Protective Signal Manufacturing Company; United States Electric Signal Company; Nachod Signal Company, Inc.; Railway Specialties Company, and Automatic Signal & Appliance Company. Other companies which have electric railway crossing signals in process of development but not yet installed in actual service are: Union Switch & Signal Company; Chicago Railway Signal & Supply Company; Bryant Zinc Company; Railroad Supply Company, and Handlon-Buck Manufacturing Company.

BRACH AUTOMATIC FLAGMAN

This signal combines audible and visible indication. For the former a locomotive bell is used, the loudness being adjustable. The visible indication employs a moving red light to convey the impression of danger by representing a swinging red lantern. The effect is produced by moving a brush over a commutator furnishing current to eight lamps, mounted in the form of an arc and plainly visible in the daytime. These are lighted successively backward and forward, and are located between lenses which face both ways from the track. A small motor is employed to operate the commutator and ring the bell. This signal has no parts exposed to the weather. For the control a type of rail contact is used. If desired, a time-element cut-out may be used also as a car-counting device. The time-element permits a train to stop within the control limits without having the bell ring continuously, and the counter allows one train to follow another closely over the crossing, both operating the signal.

HOESCHEN MAGNETO-MECHANICAL SIGNAL

This signal is actuated by a powerful spring motor wound by the natural movement of the track rail, which is transmitted to the winding mechanism by means of a connecting rod and plunger lever resting against the base of the rail. The starting control apparatus is not in any way connected with the trolley or transmission circuit, this particular feature being considered as one of the chief advantages. The small electric impulse necessary to unlatch the bell when a car passes the control point is generated in a piece of apparatus also connected with the track rail and actuated by the depression of the rail as the car passes the control point. The generator consists of a laminated permanent magnet, through the poles of which two generating coils are bolted. A keeper placed across the faces of these two poles is operated by a lever clamped to the base of the running rails in such a way that the rail is twisted and its gage line raised about $\frac{1}{8}$ in. above normal surface. When a car passes the rail is depressed to its normal level, and the lever connected with the base of the rail kicks the keeper away from the pole faces of the coils which are attached to the permanent magnet. This breaking of the magnetic circuit generates an electrical impulse which is sufficient to unlatch the bell-ringing, spring-actuated motor. The passage of the car by the crossing bell and the automatic winding due to the depression of the rail at the bell cut out the ringing mechanism.

Some of the features emphasized as of particular value to electric roads are that no battery or trolley or high-tension connection is necessary, and that neither the rail bonding nor the block signal track circuits are interfered with. As the car itself actuates the control, the bell will operate equally well whether or not the train is motor or engine-driven or whether or not the trolley is on the wire.

The indications available include the swinging bell, an illuminated sign reading "Danger," and a set of red and white semaphore blades which wave through an arc.

The Illinois Traction System has recently installed at

Champaign, Ill., a so-called silent crossing signal equipped with two oscillating blades and a flashing red danger sign 4 ft. long. This signal is placed within the city limits where the noise from a loud bell might be objectionable. Diagonally across the tracks is an illuminated sign reading "Railroad Crossing," the word "Danger" being shown also in red when a train is crossing. Others of the same type will be similarly installed.

PROTECTIVE SIGNAL MANUFACTURING COMPANY'S SIGNAL

The feature of this company's crossing signal is the simplified form of oscillator control. The oscillator acts on the push-button principle in opening or closing the control circuit, which, in turn, actuates a relay that energizes the bell, lamps and display features. The oscillator is a horizontal, weighted vibrating member with a contact point at its free end. It and its adjusting devices are inclosed in a waterproof iron box clamped to the base of the track rail at the control point. The oscillator is connected to the line through a waterproof conduit in which the leads are encased. It is in a series with a source of energy of low voltage. The passage of a car over the track imparts a vibration to the rail, and starts the vibrating member moving which, in turn, opens the control circuit within the oscillator case. This causes the line relay to drop and energize the bell or signal. The oscillator is not connected electrically with the return propulsion circuit and so may be installed and operated in the midst of interlocking or other circuits. It requires no adjustment of the track or ties. Bells are supplied with and without time-elements, and any number of oscillators may be installed within the control zone to obtain restarting control. An oscillator at the signal location serves to cut out the bell when the train passes the highway. The signal is made with both audible and visible indication, as desired.

UNITED STATES ELECTRIC CROSSING SIGNAL

This equipment consists of a crossing bell, with or without lights and semaphores, and three trolley contactors. One contactor is located at the crossing and one at each distant starting point. The contactors are directional in operation and the control is designed to provide for two cars passing through the control section at the same time. This crossing signal is operated by trolley current and its parts are standard with those of the United States trolley contactor block signal system. Also, provision is made for indicating to the motorman of an approaching car that the signal is operating.

NACHOD CROSSING SIGNAL

This signal has trolley contactor control and is fed from the trolley circuit. Three contactors, which are without moving parts, are used, the starting contactors being directional. The apparatus is standardized with that of the Nachod automatic block signal system. The control is such that cars may pass through the control zone in any manner, and so long as one remains between the starting contactor and the highway, the bell continues to ring. The bell is mounted at the top of the case which contains the oil-immersed relay and other moving parts. The danger sign, electrically illuminated, is flashed by a make-and-break contact on the bell clapper. If desired a motorman's indicator is provided.

RAILWAY SPECIALTIES COMPANY'S "WIGWAG"

This signal is used in large numbers by the Pacific Coast electric railways, one road having installed 112 of them: The signal may be mounted either on a post or on a cantilever bracket projecting from a post. The signal itself consists of a disc 26 in. in diameter and painted red. Upon it is the legend "Stop, Lookout."

At the center is an electrically illuminated red bull's-eye lens, and attached to the mechanism case is a 12-in. gong.

When in operation the red disc is waved back and forth through an angle approximately 60 deg. and at the rate of seventy-two strokes a minute, thirty-six each way. At the same time the bull's-eye lens is illuminated, at night presenting a waving red light in place of the disc. While the flag and the light are in motion the gong is sounded at the same rate as the oscillation of the disk. The gong, however, can be cut out if desired.

For electric operation the open circuit is employed, a contactor being placed at any desired distance on the trolley wire or on the third-rail. This diverts current to a high-voltage relay at the signal, thereby cutting in the power from the main conductor to the mechanism. A similar contactor, placed at the crossing and connected to the opposite side of the relay, opens the circuit as the train passes the crossing.

THE "AUTOMATIC" CROSSING BELL

This crossing bell is operated by trolley current and controlled by an insulated track circuit, one rail only being insulated, leaving the other for the return trolley current. The length of the insulated rail is determined by the speed of the cars at the crossing to be signaled, but usually extends from 900 ft. to 1500 ft. in the direction of approaching traffic. The rail section terminates at the crossing.

On single track an interlocking relay is used so that the bell rings only when cars approach the crossing. A dry battery is used to operate the track circuit in connection with a small track relay, thus assuring the continual ringing of the bell while one or more cars occupy the insulated rail. When a visual signal is desired a lighthouse type of illumination is provided by mounting lamps in front of reflectors and revolving a pair of such lamps on a vertical shaft driven by a small motor.

TYPES AND COST OF GATES AND WATCHMEN—MECHANICAL CROSSING GATES

While gates and watchmen have been used for a longer period than any of the devices described, the development and recent large use of the crossing signals indicate that the older practice was not entirely satisfactory. Watchmen were almost without exception men old in a company's employ, and the service given by them was incomplete and undependable. At the same time the cost was excessive, varying from \$25 per month for a single shift crossing protected only during the daytime to from \$50 to \$80 per month for crossings requiring protection during the entire twenty-four hours.

Crossing gates have a place which cannot be filled by any form of warning signal alone, but their use is confined mostly to busy street crossings in or adjacent to towns or villages or to main thoroughfares in thickly settled suburban districts. They are expensive to install and maintain, and until very recently required, without exception, attendants to operate them if satisfactory service was to be derived. Automatic gates have been little used on account of the danger of their dropping on vehicles or trapping vehicles on the crossings between them.

The chief disadvantage of the gate is its cost, which has absolutely precluded its use for such crossings as the average interurban railway desires to protect.

Manually-controlled gates are divided into four classes: mechanical, pneumatic, electric and wire connected, the last-named being in a general way included with the first named.

There are two classes of such gates, known as lever and crank gates, respectively. The use of the lever type allows the operator to be placed in a tower or on

the street level, while the crank type requires him to stand at one of the gate posts. Connections between gates in both types are similar, motion being transmitted from the main sheave of the gate post, through a chain to a horizontal steel rod running through a pipe. This pipe is carried under ground to either the opposite gate or the operating lever stand.

The main, or street arm, casting is provided with counterweights in the form of flat round disks, which vary in weight from 10 lb. to 40 lb., each post averaging about 60 lb. The street arms are provided with hooks for suspending lanterns by night, which are replaced by small weights by day.

PNEUMATIC CROSSING GATES

Pneumatic gates are of two types—diaphragm and cylinder—and air is supplied for them by means of hand pumps or motor compressors.

In the diaphragm type one pair of gates is operated by the application of air pressure to rubber diaphragms mounted on steel bowls. To the diaphragms are connected cranks which, through chains, operate the gate arms. The air-operated gates are mechanically connected to those across the tracks.

The cylinder gates act upon the same general principle as the diaphragm gates, except that the mechanical connection between opposite arms is replaced by air pipe connection. Two cylinders replace a single diaphragm, one for down movements in turn connected with the opposite gate cylinder through an equalizing cock, and one for upward movements similarly connected. The reason for using this connection is that less air will escape over piston heads of opposite cylinders than will escape through stuffing boxes. In the installation of this type the loads on cylinders must be balanced carefully and the air-pressure load distributed equally. Drainage must also be carefully considered to avoid freeze up from condensation.

ELECTRIC CROSSING GATES

The electric gate is of recent design and few are in actual operation. In one type of motor-operated gate a $\frac{1}{4}$ -hp series motor is placed in each post. A heavy roller chain runs from a socket on the motor shaft to one on a worm shaft, the worm meshing with a worm gear. A forked connecting rod is fastened on a pin projecting through the worm gear giving a central pull on it. The other end of the connecting rod is connected to the main-arm shaft. A magnetic brake is used to stop the motor instantly when the current is cut off.

The motor is operated from a small switchboard in the tower by means of a double-throw switch. In one position of the switch current flows through the motors in a direction to drive the gates upward, and when the street arms have risen to an angle of 70 degrees an automatic cut-off in the gate post shuts off power and the magnetic brake, being de-energized, locks the gate in position.

WIRE-CONNECTED CROSSING GATES

Wire-connected gates are specially adapted to high and dry locations where the gates are a short distance apart. Timber posts treated well with wood preservative are used and the cast parts are few in number and easily assembled. The main shaft is held in place by a cast-iron shaft box bolted to the post. Motion is transmitted in much the same manner as in the mechanical gate except that two iron wires replace the horizontal rod. These wires are run through pipe, filled with oil or graphite and with stuffing boxes at the ends. Chain is used on turns. Counterweights are pro-

vided on the street-arm casting, and a center stop with a coil spring minimizes the strain when the gate is lowered.

CROSSING GATE ARRANGEMENT FOR SPECIAL CASES

On the Chicago & Oak Park Elevated Railroad, west of Laramie Avenue, trains are operated on the surface. The tracks parallel the elevation of the Northwestern Railway. On the north side is a retaining wall and on the south is the street line which compels the gateman to operate between tracks. To give him protection an enclosure 4 ft. high has been built between tracks in a parkway. Four posts are set in the ground and enclosed on three sides with dressed and matched lumber, making an enclosure 4 ft. x 6 ft.

On the Northwestern Elevated Railroad, Evanston division, people continually went under the gate arm. Simple attachments or aprons were added to the street and sidewalk arms, consisting of pine strips suspended parallel to the arms by means of strap iron. This type of apron has been adopted as standard on all lines of the Chicago Elevated Railways. "Safety first" signs, enameled red and white on No. 16 sheet steel, are placed on the outside spaces of all gate arms.

COST FIGURES FOR CROSSING GATES

The table gives the cost for installing, operating and maintaining gates of the four types described.

Type of Gate	Number of Typical Sets Taken as Criterion	Average Cost of Installation, Four-Post Set	Operation Per Year per Set (average)	Maintenance per Year per Set (average)	Remarks
Mechanical ..	55	\$475.00	\$900.00	\$30.00	(Exclusive of tower)
Pneumatic ..	319	700.00	820.00	50.00	(Exclusive of tower)
Electric	1	950.00	984.00	60.00	Estimated
Wire-operated	1	160.00	500.00	20.00	Estimated

RECENT DEVELOPMENTS IN CROSSING GATE DESIGN

A recent development is an automatic gate, illustrated herewith, which does not obstruct passage over the crossing while the gate is down. It consists of an arm supported on a post located at the side of the highway, and a number of light chains depending from the arm which, in the lowest position, reach to within a few feet of the ground. The arm is operated by an electrical mechanism housed in a case at the bottom of the post. The arm itself never descends below a height sufficient for a vehicle to drive underneath it, in this way affording an easy exit from the crossing in case the arm is lowered while a passing vehicle is upon the crossing.

The position of the arm is an indication as to whether or not it is safe to proceed over the crossing, the chains forming a tell-tale in case the warning is overlooked. The arm is illuminated at night by means of a light placed near the top of the signal post and, in addition, a bell is rung and a red light is displayed toward the highway when a train is approaching. The control of this device can be through the medium of a track circuit, track instrument or trolley contactor.

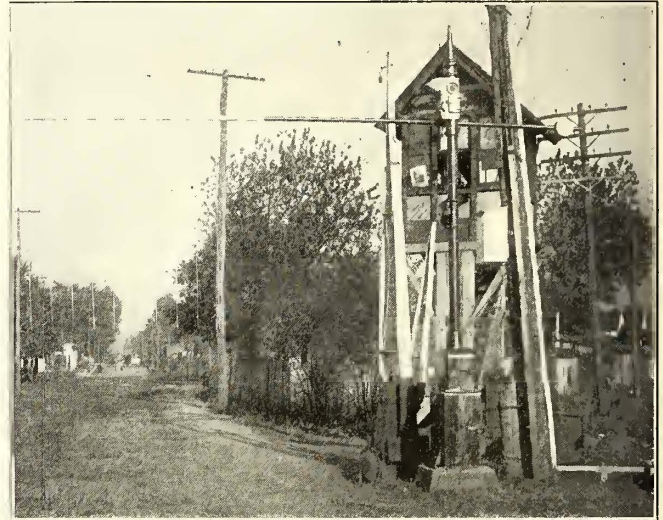
CENSUS OF CROSSING ALARMS IN USE BY MEMBER COMPANIES

From the data sheets sent to electric railways in the State, the committee learns that seven had crossing alarms of some nature in use, seventeen did not use them and five did not reply to the questions.

Of the roads using protective apparatus, the largest number in use on any one property was sixty-four. The total number of signals in use by the seven member

companies was 166, of which number 104 were audible only, two were visual only and sixty were both audible and visual. By way of explanation it may be stated that the joint use of audible and visual indication is of much more recent development than the use of audible signals alone.

As to the method of controlling these signals, 105 were operated by track instruments and sixty-one by either trolley or third-rail contactors. Seventy-eight bells had time-limit devices to cut off the signals when a certain fixed time had passed after the giving of the impulse which originally started the signal, but those roads having the majority of installations without this feature stated that it was a desirable one. In fact, only one road stated that the time-limit device was not of considerable benefit.



HIGHWAY CROSSING PROTECTION—HIGH-ARM CROSSING SIGNAL WITH LIGHT HANGING CHAINS

Outside the State the largest crossing signal installation is one of 112 signals, of which eleven are purely visual, the balance being both audible and visual. All are controlled by trolley contactors.

INSTALLATION, MAINTENANCE AND OPERATION COSTS OF SIGNALS

The costs obtained by the committee differed widely, due undoubtedly to varying local conditions. The average cost of installing a single-track warning signal, exclusive of the cost of the signal itself, was \$110, the range being from \$90 to \$150.

The number of signals which could be maintained by one man varied from fifteen to fifty, the average being about forty-four. This wide difference can be partly accounted for by the fact that some roads combine the cost of signal maintenance with other signal and telephone costs, while others state the costs for bells alone.

One road, having a total of twenty-nine signals, maintained them at a monthly cost of 65 cents per bell, the data being collected over a year's operation. Another road with sixty-four signals reported the cost as \$2.86 per signal per month, while some roads reported as high as \$7 per signal per month. Sufficient data were not at hand to reduce this maintenance cost to a basis of a single operation. Of the two roads instanced above, the one with the smaller up-keep cost had somewhat fewer than one-third the number of operations of the road having the maintenance cost of \$2.86, showing that the maintenance cost per operation does not differ greatly. The average maintenance cost from all replies received was \$3.25 per bell per month, which appears to be higher than it should be.

The large differences in the figures will be better understood in the light of replies to questions as to the frequency of required inspection. Two roads inspected daily, four weekly and one every two weeks. This undoubtedly is governed very largely by the number of train movements past the crossings, as well as by other local conditions, thereby making a direct comparison of replies somewhat misleading.

Suggestions were asked as to the desirable improvements in signals, and in the replies the need for an indicating light for the motorman frequently appeared. The bettering of the indication was suggested, as was also the need for a signal which would show a green light or other proceed indication to a vehicle when no train was approaching, and a stop or danger indication when the signal was out of order.

It was found from the canvass, also, that usually, in addition to the signal itself, crossings were announced by some form of the customary crossing sign.

Finally the committee pointed out that methods of protection of highway crossings are still in the developmental stage and that no recommendations can be made at this time. It was suggested, however, that closer attention be given during future development to obtain more uniform aspects. This matter lies with the manufacturers but, in order to solve it successfully, an intimate knowledge of the railroad company's requirements is necessary and a close co-operation with the various companies is desirable.

Municipal Operation in England

Mr. Connett Points Out a Number of Its Disadvantages—Few Municipally-Operated Lines Are Successful

A. N. Connett, chief engineer and joint managing director of J. G. White & Company, Ltd., of London, has been in New York on a short visit. During his residence of eighteen years abroad, Mr. Connett has had many opportunities to observe municipal operation of public utilities. At the request of the *ELECTRIC RAILWAY JOURNAL* he described some of his experiences and impressions from a study of municipal ownership and operations in Great Britain.

"Unfortunate as some of the experiences of municipalities in their public utilities have been in England," Mr. Connett said, "political conditions are much better there than in this country. They do not constitute the same handicap to successful operation that political conditions impose on municipally-owned plants here. Municipal politics have always presented the worst element in politics in this country, and the extension of the activities of cities to the operation of the various public utilities here would seriously enlarge the opportunities for mismanagement, poor service and waste in expenditure.

"When a man is employed by a city in England it appears to have a very bad effect on his power of initiative and ability to develop. These are qualities that are greatly needed by managers of utilities. As a rule the men who are employed in municipal undertakings would prefer to work for corporations. As managers of municipal properties they are required to do many petty things that would not be thought necessary in corporate properties, such as to make voluminous reports at the request of an alderman or other city official who has authority to ask for information but who has not the ability and training to use it wisely when he receives it. Much of the time of managers of municipal undertakings is taken by political superiors who issue commands and requests regardless of the money and energy involved. Municipal service is deadly to energetic men. It takes

the ginger out of them, and they lose their best powers of usefulness."

Mr. Connett gave several illustrations of difficulties in municipal operation. For example, in one city where his company built the tramways the manager thought he could economize a little to help overcome the deficit in earnings. He decided to replace a grown man by a boy. "Objection was raised," added Mr. Connett, "and finally a special meeting of the tramway committee and then of the City Council was called and the plan was formally rejected.

"In another English city where the municipal tramways were built by J. G. White & Company, Ltd., the rails were ordered from Belgium at a saving of £1,000 below the bid of English manufacturers. The specifications had not provided that English rails must be used. An unjust inspection was imposed by the city with the result that the Belgian rails were rejected. At a meeting called to consider the protest of the company, the technical composition of the rails was discussed. One alderman asked: 'What is this silicon that they are talking about?' Some one explained that it was something like pure sand. The alderman then commented, 'Oh, I see, them Belgians are putting dirt in the rails.' This was typical of the kind of knowledge on matters of tramway construction and operation that is sometimes found in City Councils." Continuing, Mr. Connett said:

"The fact that so many of the municipal tramways are unsuccessful creates nervous tension between the public and the management that in itself tends to prevent the introduction of measures that would produce profitable operation. Where municipally-owned plants are profitable the British public is in favor of them. Where they do not pay the public is very much disgruntled. In the entire list of municipal tramways there are very few that are successful financially.

"One unfortunate result of municipal ownership and operation in England is that towns are bound too closely by the restricted development of their tramway systems. Cities and towns often do not take in their suburbs, and the operation of their tramways stops at the corporate limits. Municipally-owned properties may have no rights to extend beyond their borders. At the border lines in many instances they meet the systems of private companies, but passengers who want to ride in the territory of the connecting line must change cars. They cannot go comfortably from one municipality or town to another or to the suburbs. The absence of facilities for convenient travel from one community to another restricts the development of the riding habit. It makes the properties self-contained to a degree that is rather fatal to the successful enlargement of tramway earnings. Much has been said about the ha'penny fare in Glasgow. The fact is that Glasgow has an area about one-half mile square in its central district in which an immense traffic exists. The ha'penny fare is good for transportation only in this limited district. A passenger who travels beyond this short zone has to pay a larger fare. The tramways in Dublin, which are privately owned and operated, are doing very well and present an excellent example of corporation efficiency and development.

"Interurban railway men in this country are likely to conclude that interurban roads in England would be very profitable. The exact reverse has been shown to be the fact. Since the riding habit has not been developed as fully in England as in this country the people appear to be contented to remain in their home towns. From a traffic standpoint the large system between Liverpool and Manchester has not worked out satisfactorily. One undoubted reason for this is that it does not reach the central districts of those cities. Owing to the unwillingness of the municipal tramway

systems to permit entrance and terminals to lines of this character, the company is forced to operate from the outskirts of one city to the outskirts of the other. This is a traffic handicap that it is almost impossible to overcome.

"One difficulty about the operation of utilities in England is that government regulation adds such very heavy costs to every step. Parliament deals with almost all matters. It is necessary to have plans for Parliament and a parliamentary lawyer. It would facilitate governmental action and reduce the expenses chargeable to capital costs of new undertakings if parliamentary practices should be reconstructed and some of the powers were delegated to other smaller bodies with authority to act in restricted districts. The regulations of the Board of Trade are intelligent and cannot be considered onerous. In fact, the railway and other public service commissions might study to advantage the workings of the local government board and the Board of Trade."

The unprofitableness of municipal tramways, which Mr. Connett mentioned, is based on accurate accounting regulated by law, leaving no opportunity for misrepresentation. Overconstruction of municipal lines at the urgent representation of aldermen who have the interests of their individual constituents and not the entire community in mind is one cause of the difficulty. "The extension of municipal ownership to public utilities," Mr. Connett said, "has restricted the legitimate field of investment for private capital. It is one of the causes that has led the British to search the face of the earth for foreign company investments instead of holding their money at home. It is a handicap upon the British investor as well as upon development."

Notwithstanding the existence of municipal ownership in many communities Mr. Connett mentioned the curious fact that the water supply of London is still owned by a private company. In the plan to centralize the supply of electrical energy in London the capital will be contributed by a new company, and operation will be in its hands, although ultimate public ownership will be possible after the contract period of fifty years is ended.

"Competition from motor buses affects some of the tramways in England to a serious extent," continued Mr. Connett. "Some of the English municipal systems would be opened to tenders for operation by private companies if companies could be found that were willing to take over the deficits and risks that characterize these systems. Private capital, however, hesitates to undertake the operation of systems which have shown regular deficits year after year. There is intense jealousy on the part of managers of municipal tramways and officials towards those of private companies. They rarely join in meetings or business negotiations of any kind. This is unfortunate and it does not benefit anybody."

"The managers of municipal central stations are much farther advanced in their ideas and practices than the managers of the tramway systems. They are trying to get a satisfactory day load, and have formed the Point Five Association which is doing advanced work to develop the market."

Mr. Connett sailed for London on Dec. 30, and expected to be there only a short time before leaving for Brussels to take charge of the distribution of relief supplies to the Belgians as a vice-chairman of the Commission for Relief in Belgium.

The *Utica Press* says: "As a rule railroad employees are proverbially polite. They are asked more fool questions in a day than any other class of people, and answer them more courteously. Their patience is tried frequently and sorely, but they usually put up with it good-naturedly and let it go at that."

Convention of Western Red Cedar Association

The ninth annual meeting of the Western Red Cedar Association was held on Monday, Jan. 11, 1915, at the offices of the Lindsley Brothers Company in Spokane, Wash., President M. P. Flannery presiding. Representatives of eleven member companies were present. In his address to the association President Flannery stated that, after the last annual meeting, the piling committee had adopted specifications covering cedar piling which had been approved by the board of directors and had been universally adopted since that time. The National Electric Light Association also had included specifications on western red cedar poles in its new handbook. During the entire year, he said, posts had moved quite freely at fair prices, but at no time had there been a brisk demand for poles or piling. The stocks on hand had been very large in proportion to the amount of consumption. He believed that the putting into operation of the regional banking system would place funds at the disposal of constructive corporations and thereby stimulate the red cedar business by reason of its power to concentrate the required credit at the point where most needed.

At the election of officers which followed W. M. Leavitt of the National Pole Company, who was vice-president during the year 1914, was unanimously elected president, and E. T. Chapin, of Spokane, was elected vice-president without opposition. The association then voted for three directors, G. C. McDonald, N. C. Culver and W. M. Burns being elected. R. L. Bayne was re-appointed as secretary-treasurer.

At the luncheon which followed the business session C. P. Lindsley spoke on the future of the cedar pole industry and expressed the belief that the electrification of the Butte, Anaconda & Pacific Railway and the mountain divisions of the Chicago, Milwaukee & St. Paul Railway were simply precursors of a general installation of electric power by the steam railroads. This could not but be beneficial to the red cedar industry as no pole had been discovered which could take the place of cedar. To secure the benefits of this it would be necessary for all the dealers to co-operate in urging the use of the Western red cedar pole and to work for the industry as a whole rather than for individual advantage.

During the afternoon session the directors were instructed to take means to advertise the advantage of the Western red cedar poles to the trade, particularly in the Atlantic states, where other species of poles are being used.

Bombardment of the Hartlepool Tramways

During the bombardment of Hartlepool on Dec. 16 by German armored cruisers, states the *Tramway and Railway World*, the municipal tramways suffered considerable damage. The roof of the offices was struck by a shell and a part of it was carried away. The flag-staff on top of the carhouse was splintered and a shell fell a few yards to the rear of the carhouse and buried itself in the railway embankment. Trolley wires were brought down for a distance of about 300 yd., but no poles were damaged. The windows of several of the cars in service were shattered, and a controller on one car standing in the carhouse was struck by a piece of shell which came through the window of the carhouse. One member of the office staff sustained a slight scalp wound, but fortunately no other members were injured by the bombardment.

American Wood Preservers' Association

At the Convention in Chicago Recommendations for Plant Operation, the Bleeding and Swelling of Paving Blocks, the Annual Maintenance Cost of Ties and Other Subjects of Electric Railway Interest Were Discussed

The eleventh annual convention of the American Wood Preservers' Association was held in Chicago on Jan. 19-21. During the three-day meeting a number of important committee reports were presented, including that of the committee on specifications for the purchase and preservation of treatable timber which suggested modifications of the American Railway Association's standard specifications in regard to the heartwood and sapwood requirements, the present limits for sapwood being considered unduly severe. The reports and papers are given in brief abstract form in the following paragraphs, as lack of space prohibits extended republication of the data contained in them.

RECOMMENDATIONS FOR TREATING WOOD

The committee on specifications for the purchase and preservation of treatable timber discussed the purchase of various kinds of woods with regard to the use after treatment, stating that the fundamental requirements of structural timbers intended for treatment were strength and capacity for treatment to an extent which would insure protection against decay on all exposed surfaces. A penetration of $\frac{1}{2}$ -in. on the heart faces was recommended as a safe minimum on structures above ground. The specifications of the American Railway Engineering Association as to general requirements for treatable timber were accepted for the present, but several modifications were suggested including in general more liberal allowances for sapwood.

The report contained an outline for the best procedure to follow in preparing timber for treatment, and gave specifications for preservatives and general methods for their application. In a summary of fundamental principles the report stated that preservative treatment should be limited to those kinds of wood which are not in themselves resistant to decay, thus making timber available which otherwise would be useless, and which is obtainable at low cost as compared with durable species. Only sound timber should be treated, as treatment will not cure decay nor defects of any kind. The moisture content of the wood before treatment should be reduced, preferably by air seasoning, to not more than 20 per cent of its oven dry weight. The temperature in the treating cylinder should never be raised above 260 deg. Fahr. in steaming, nor above 200 deg. Fahr. during oil immersion. In the boiling process the oil temperature may be increased to 220 deg. Fahr. The minimum duration of treatment, except with easily penetrated woods, should be equivalent to one hour for every radial inch on the sticks treated. All structural timber should be framed before treatment, and, in lieu of this, unimpregnated wood exposed by framing after treatment, should be thoroughly painted with hot creosote oil. All ties should be bored and adzed before treatment. Although sawn ties may have a uniform surface, the boring increases the penetration at the point where most needed. Efficiency of treatment should be based primarily on the extent of distribution of a stated amount of preservative, rather than on final retention per cubic foot. The report concluded with a discussion of regional considerations with regard to the best preservatives to be used and the best methods of application.

The report of the committee on plant operation

recommended that the term "creosote" be used only to designate an unadulterated distillate of a pure coal tar, and stated that the application of this term to a mixture of creosote with any other substance, such as tar, tar oils or petroleum was misleading and bad practice. Recommendations regarding the properties and methods of use of creosote were also included. With regard to zinc chloride the report said that, since established records indicate that $\frac{1}{2}$ lb. of dry chloride of zinc per cubic foot of timber is essential to insure proper protection against decay, the use of smaller quantities is not considered standard practice. All material treated with zinc chloride solution should be treated to refusal.

Ties that are stored at plant for seasoning should be stacked on treated sill ties, with ample provision for air circulation through and between the stacks. It is not good practice to stack ties in a yard that is not properly drained, nor to stack them on wholly or partially decayed timber, nor to leave pieces of decaying timber about a tie yard or treating plant. Green ties should not be stacked in the same stack with more or less seasoned ties. Poles should be peeled and seasoned under conditions permitting ample air circulation, and, in addition, all roofing, galling and boring should be done before treatment. Wherever it was possible to arrive at a unit base from which to work, all handling of material at a treating plant should be done at a fixed price per unit. In treating green or unseasoned timber, piling, ties, etc., steaming should be considered good practice, but in no case to exceed a maximum temperature of 280 deg. Fahr., steaming to be followed by a vacuum of not less than 22 in., temperature in cylinder being maintained at as high a point as possible during time of vacuum. As general tests and observation prove that creosote evaporates rapidly from freshly treated material it should no longer be considered good practice to stack creosoted material in open stacks, but material treated with zinc-chloride should be stacked openly to facilitate the evaporation of water injected during treatment.

PAVING

The report of the committee of wood-block paving included a history of treated wood-block pavements in the United States, and gave an outline of the development of the modern treated wood pavement. In an inspection of experimental pavements made in Minneapolis last July the different species of woods in use at present for paving block were classified in the order of their efficiency as follows: longleaf pine, white birch, Eastern hemlock or tamarack, Norway pine, and Western larch. Details of manufacture were discussed, including such matters as depth of blocks, preservatives, method of treatment, methods of laying joints and filler, and top dressing. A discussion of the qualifications of wood-block pavements followed. This included consideration of first cost, durability, ease of maintenance, ease of cleaning, and the like. A bibliography and a table showing the amount, kind and condition of treated wood-block paving in the country concluded the report.

A paper entitled "The Bleeding and Swelling of Paving Blocks" cited results from a number of tests. All

of the results seem to indicate that bleeding is caused to a large extent by the expansion of air in the wood cells. Other contributing causes which no doubt aggravate bleeding are expansion of the preservative in the wood, external pressure exerted upon the blocks, excessive absorption of preservative by some of the blocks, and the use of rapid-growth woods. Sapwood is also a factor, largely because of the excessive absorption.

In general, the tests seem to indicate that longleaf-pine paving should be treated in the green condition after being well steamed. While it is true that a preliminary and final vacuum greatly retard bleeding and to some extent the swelling of air-seasoned wood, a preliminary vacuum will tend to make the absorption of oil too rapid during treatment, resulting in uneven penetration. A steaming period, therefore, is advisable to render the absorption less rapid and allow a longer and intense pressure period to be applied. Furthermore, if seasoned blocks are steamed they will take up moisture and expand and should be less liable to give trouble from swelling after laying in the street. For these reasons it would be preferable to treat green material when it is possible to obtain it.

If for any reason the blocks cannot be laid soon after treatment, they should be covered and perhaps wet down occasionally to prevent them from drying out. It is likely that if the blocks are wet when laid, expansion troubles will be much reduced.

It would seem to be desirable to give a vacuum treatment after the steaming period and also after the oil has been removed from the cylinder. If tar mixtures are used, a final steam bath should succeed the final vacuum to remove carbon and dirt from the blocks. Absorptions of more than 16 lb. per cubic foot hardly seem necessary. Heavier absorptions do not greatly retard swelling and they tend to increase bleeding.

The use of tar mixtures will not prevent swelling, although they tend to retard it. Therefore, the only justification for mixing tar in oils to be used for treating paving blocks is to lower its cost. The waterproofing effect of the oil or treatment should not receive much consideration. The main points to be considered (aside from the selection of wood) should be to have sufficient oil of good grade to obtain a thorough penetration in order to avoid decay and to specify a method of treatment that will not cause the blocks to bleed. Swelling should be controlled principally by having the blocks in the green condition when laid in the street and by taking special care with the filler and method of laying so that water will not permeate to the bottom of the blocks.

In a paper on the relative accuracy of laboratory analyses after treatment as opposed to actual records during treatment of creosoted wood paving blocks in determining the average quantity of injected creosote oil per cubic foot of timber, it was stated that modern creosoting methods involve the treatment at one time of some 30,000 individual, and very different, paving blocks. These are placed in the same creosoting cylinder and subjected to the same temperature and same pressure. It is impossible to give each block an individual treatment, and since blocks of varying structure must be treated collectively, it is but consistent to insist that an extremely small proportion of the whole, selected at random for analysis, cannot be conclusively indicative of the average absorption secured on the entire charge. The records of the operation, however, give definitely the average amount of injection of preservative per block.

TREATED CROSS-TIES

A paper entitled "Additional Facts on Treated Ties" called attention to the increasing cost of creosote treat-

ment and the use of emulsions of zinc chloride and creosote and of zinc chloride, glue and tannin. Figures were cited to show that the former gave a lower annual cost per tie than either the creosote or straight zinc-chloride treatments. Results obtained with the zinc-chloride-glue-tannin treatment on the C. & E. I. Ry. showed a life of fourteen years for 75 per cent of a large number of ties.

A simple method for finding the annual charges for ties was suggested in another paper, this being based on the statement that the annual maintenance charge on each tie was equal to the first cost of tie in track divided by the average years of life (as determined by number of removals), plus the annual interest on investment, or first cost of tie in track, plus also the taxes on investment. The authors assumed interest at 6 per cent and taxes at 1 per cent and stated that a good tie in main track costs at least \$1 and that the tie, unless treated, wears out in seven years, giving an annual cost of \$0.213. At this rate it would cost a road with 25,000,000 ties \$4,000,000 a year more than it did twenty years ago. Creosote, at a cost of 25 cents, and heavy tie plates at a cost of 35 cents more, raised the first cost to \$1.60. Such a tie would have to last 16 years to give a yearly cost of \$0.213. Assuming that it lasted ten years, the annual cost would be \$0.273. This involves \$5,500,000 a year more than the expense in 1905.

There is at present no immediate prospect of an economical substitute for wood. A certain cast-iron tie, which the patentee thought could be made for \$3.50, involved interest and tax charges alone of \$0.245. Assuming the tie to last thirty years and to have a scrap value of \$1, the tie would cost \$0.328 to maintain. There is still nothing fulfilling the purpose as cheap as a good wooden tie. It is at present unreasonable to consider anything, even with a certain life of 20 years that costs more than \$1.67, since 20 cents a year is sufficient at the present time to maintain best main-line ties.

In general, careful buying insures a price reduction of about 10 per cent and a quality increase of about 20 per cent. To allow ties to lie fallow for, say, two years shortens the life two years and adds about 14 cents to first cost. Many ties are removed from one year to five years before they are really gone. A new, rotten tie costing 80 cents to lay in track and lasting two years, costs \$0.456 per year, or more than twice as much as the maintenance of the best main-track tie, plated and preserved.

A paper on the mechanical life of ties as affected by ballast stated that fine, light materials such as gravel, cinders, granulated slag, etc., hasten the rail cutting on the top of the tie by the finer particles working under the rail. The coarser and heavier ballasts, such as crushed stone and slag, bruise and cut into the bottom and the sides of the ties largely under tamping. However, comparatively few ties are destroyed from this latter cause, while many more are removed from track on account of the former.

A specification for a coal-tar-creosote solution was suggested in another paper with the idea of avoiding any misunderstanding on the part of the purchaser regarding the material for which he was paying. A paper on air seasoning of cross-ties emphasized the necessity that all ties, soft wood ties especially, should be carefully piled on sound stringers but never on the ground, and either with spacing strips between layers, or that they be piled so that the faces do not have full bearing against each other, as experience has shown that ties piled close soon show damage. Also it is not safe to buy softwood ties while the sap is up, no matter how carefully the ties are piled for proper seasoning, as they are liable to be damaged before they are loaded.

Electric Railway Statistics

Figures Compiled by the Bureau of Fare Research Based on Returns from 80 Per Cent of the Electric Railway Industry for Four Months' Operation

By a resolution passed at the mid-year meeting of the American Electric Railway Association on Jan. 30, 1913, the committee on cost of passenger transportation service was directed to consider the matter of the establishment by the American Electric Railway Association of a permanent organization to study the problems of rates and fares. Such a bureau was established on May 1, 1914, and, as mentioned in this paper at that time, F. W. Doolittle was appointed director. Part of the work done under the direction of the committee on the cost of transportation service was represented by a report on the method of estimating remunerative passenger haul in urban transportation systems and of the relations between traffic and population. The results of this study were published in the ELECTRIC RAILWAY JOURNAL for June 20, 1914. Another part of the work of the bureau has been the collection and compilation of operating statistics of the industry. At present the bureau is receiving monthly reports from companies representing a considerable part of the operating revenues of the entire industry in this country. From the reports already obtained the director of the bureau has prepared a comparison of four months' business during the summer of 1914. The absence of reports covering similar statistics for the previous year made a comparison with such reports impossible, but comparisons are made with statistics of steam railroads, bank clearances and building operations for the same months. The report follows:

BASIS OF REPORT

While the collection of the operating statistics by the bureau of fare research has not yet been under way a sufficient length of time to permit comparisons month by month with the previous year, some interesting facts have been observed concerning the trend of earnings and expenses during the four months, June to September inclusive. The accompanying tables representing returns from 137 companies classified according to the

TABLE I—OPERATING REVENUES OF 137 COMPANIES IN THE UNITED STATES

No. of companies	STATES			
	United States 137	East 76	South 21	West 40
June	\$28,132,324	\$22,058,585	\$1,488,808	\$4,584,930
July	28,378,996	22,192,993	1,525,474	4,660,528
August	27,949,219	21,881,679	1,515,602	4,551,937
September	27,073,682	21,184,602	1,432,884	4,456,195
Per cent				
July of June...	100.88	100.61	102.46	101.65
August of June...	99.35	99.20	101.80	99.28
September of June	96.24	96.04	96.24	97.19

TABLE II—OPERATING REVENUES AND EXPENSES OF 120 COMPANIES IN THE UNITED STATES

No. of companies	IN THE UNITED STATES			
	United States 120	East 60	South 20	West 40
Operating revenues				
June	\$22,598,682	\$16,616,420	\$1,397,331	\$4,584,930
July	22,751,376	16,658,070	1,432,778	4,660,528
August	22,436,710	16,460,202	1,424,570	4,551,937
September	21,780,976	15,978,982	1,345,798	4,456,195
Per cent				
July of June...	100.68	100.25	102.53	101.64
August of June...	99.28	99.06	101.95	99.28
September of June	96.38	96.16	96.31	97.19
Operating expenses				
June	\$12,738,310	\$9,573,546	\$766,175	\$2,398,588
July	12,784,221	9,283,111	774,624	2,726,485
August	12,458,013	9,058,867	745,218	2,653,927
September	12,115,174	8,839,204	716,328	2,559,641
Per cent				
July of June...	100.36	96.96	101.10	113.60
August of June...	97.80	94.62	97.26	110.65
September of June	95.11	92.33	93.49	106.71
Operating ratio				
June	56.37	57.61	54.83	52.31
July	56.19	55.73	54.06	58.50
August	55.53	55.03	52.31	58.30
September	55.62	55.32	53.23	57.44

Interstate Commerce Commission's geographical grouping of companies indicates that the falling off of revenues occurred uniformly throughout the country.

The totals shown in these tables contain revenues reported by both city and interurban lines. The relation between the operating revenues of the companies located in the Eastern, Western and Southern districts and the total for all companies for 1912 and the relation occurring in the above figures are here compared:

	1912	Table I
United States	100	100
Eastern district	67.5	78.4
Southern district	10	5.3
Western district	22.5	16.3

Of the 137 companies whose figures are shown in Table I, 120 reported operating expenses excluding taxes (see Table II) and eighty-eight showed also revenue car-miles and number of passengers (see Table III). It would be of value to compare these figures with figures for the same companies at corresponding periods in 1913 and in 1912, but such figures are not available at this time.

IN EXPLANATION OF TABLES

In reading the tables, there should be borne in mind that there is a normal seasonal variation of traffic from month to month and that the variation in the length of the months and in the number of Sundays and holidays is easily observed in traffic statistics. During the five years, 1907-1912, there was an increase in an-

TABLE III—OPERATING REVENUES, EXPENSES, CAR-MILES AND PASSENGERS OF EIGHTY-EIGHT COMPANIES IN THE UNITED STATES

No. of companies	IN THE UNITED STATES			
	United States 88	East 38	South 15	West 35
Operating revenues				
June	\$9,907,747	\$5,648,800	\$616,293	\$3,642,652
July	10,088,682	5,773,963	644,589	3,670,129
August	9,979,368	5,742,817	641,088	3,595,461
September	9,557,950	5,479,628	585,475	3,492,845
Per cent				
July of June...	101.83	102.21	104.59	100.80
August of June...	100.72	101.66	104.02	100.75
September of June	96.47	97.01	95.00	95.89
Operating expenses				
June	\$6,059,255	\$3,811,623	\$337,232	\$1,910,398
July	6,074,909	3,504,275	354,676	2,215,957
August	5,916,024	3,430,865	342,428	2,142,730
September	5,762,028	3,373,498	321,478	2,067,050
Per cent				
July of June...	100.26	91.94	105.17	116.00
August of June...	97.63	90.01	101.54	112.16
September of June	95.09	88.51	95.33	108.19
Operating ratio				
June	61.16	67.48	54.71	52.45
July	60.22	60.69	55.02	60.38
August	59.28	59.74	53.41	59.60
September	60.29	61.56	54.91	59.18
Car-Miles				
June	33,290,437	18,181,532	2,382,471	12,726,434
July	34,588,159	19,138,446	2,474,952	12,974,761
August	34,353,180	19,075,495	2,489,788	12,787,897
September	32,383,777	17,752,971	2,320,033	12,310,773
Per cent				
July of June...	103.90	105.26	103.95	101.85
August of June...	103.19	104.92	104.45	100.35
September of June	97.27	97.64	97.40	96.80
Passengers carried				
June	246,207,158	136,893,985	13,865,061	95,448,112
July	250,013,398	139,444,703	14,413,498	96,155,197
August	246,541,498	137,699,251	14,290,541	94,551,706
September	238,052,912	133,769,637	12,935,175	91,348,100
Per cent				
July of June...	101.55	101.90	103.96	100.85
August of June...	100.08	100.65	103.10	98.95
September of June	96.75	97.75	93.40	98.00

TABLE IV—U. S. STEAM ROADS—FIVE YEARS' AVERAGE OF REVENUES AND EXPENSES, STATED AS PERCENTAGES

	Revenues	Expenses
June	100.0	100.0
July	102.7	102.2
August	107.6	104.4
September	109.3	104.5

nual operating revenues of about 25 per cent of the yearly revenues at the end of the period. Assuming that this rate of increase is normal at the present time, we might conclude that July, 1914, should show a 5 per cent increase over July, 1913, and that the amount by which this 5 per cent increase failed of realization is in effect a loss. The ELECTRIC RAILWAY JOURNAL for Nov. 28, 1914, page 1217, compares the earnings of a number of companies in September, 1914, with their earnings in September, 1913. Very roughly, these figures indicate a falling off of 1 per cent in gross and falling off of 2 per cent in net. A study of the records of past years of a large number of companies widely scattered indicates that, in general, the operating revenues of June and July are substantially equal from year to year to those in August and September, July and August being normally larger than either June or September. Table IX reflects the comparative results of variation on this basis of comparison.

As illustrating the effect upon net earnings in the traction industry of slight variations in revenues, it is worth while to point out that when operating revenues decrease to 97.4 per cent of normal and operating expenses are slightly greater, or 98.2 per cent of normal, the net returns of the industry, because of the small margin on which the electric railway is operated, decrease more than 17 per cent, or from a dividend rate of 2.68 per cent to 2.22 per cent.

RESULTS COMPARED WITH STEAM ROAD STATISTICS

A comparison of the steam road figures for 1914 with those for 1913 raises, of course, the question of the normality of 1913 results. Table IV, showing the vari-

TABLE V—REVENUES AND EXPENSES OF U. S. STEAM ROADS IN DOLLARS PER MILE OF LINE

	Operating revenues		Operating expenses	
	1913	1914	1913	1914
United States:				
June	\$1,135	\$1,079	\$801	\$768
July	1,183	1,124	837	785
August	1,244	1,175	856	789
September	1,257	1,182	854	781
Eastern District:				
June	\$1,999	1,860	1,438	1,355
July	2,087	1,939	1,504	1,373
August	2,185	2,045	1,533	1,377
September	2,142	2,024	1,534	1,374
Southern District:				
June	\$862	860	638	646
July	876	884	660	665
August	908	887	673	658
September	944	860	675	642
Western District:				
June	\$820	788	560	535
July	863	828	583	554
August	914	867	599	559
September	948	901	595	553

ation of operating revenues and operating expenses for the months of July, August and September in per cent of the month of June, is based on the return of all steam roads for five years and should be fairly typical.

The figures shown in Table V were compiled by the bureau of railway economics from reports to the Interstate Commerce Commission and indicate that operating revenues disclose the usual seasonal variations, and operating expenses show less than the usual increase during the summer months. A comparison of the decrease in earnings per mile of line in 1914 as compared with 1913, indicates that the decrease in railroad business due to the present depression, has for some time been general. While the percentage of seasonal variation has therefore been normal, the absolute increase has not been as great as indicated by the percentage figures.

Since comparative figures of seasonal variation in the traction industry are not available for 1913, it is not possible to determine whether the same absolute changes have taken place in the traction industry as are here observed for all steam railroads. From such comparative figures as are available, covering perhaps 20 per cent of the traction industry in 1913, however, the comparisons indicate that the present depression has been felt to a greater extent in the traction industry than with the steam roads.

BANK CLEARINGS AND BUILDING OPERATIONS

Bank clearings are usually supposed to be fairly representative of business conditions as a whole, although they are only so if they are an index of total bank transactions. A study of this basis of comparison appears in a recent number of the *Times Annalist*, where a number of the factors which tend to destroy the use-

TABLE VII—VALUE OF BUILDING PERMITS 1914 in per cent of 1913

	June	July	August	September
Eastern	112.0	119.0	117.0	61.0
Middle Western	102.5	107.7	110.0	77.0
Southern	77.0	156.0	86.0	59.0

TABLE VIII—GENERAL STATISTICS FOR UNITED STATES, STATED AS PERCENTAGES OF JUNE FIGURES

	Electric railways—Revenues	Steam railways—Revenues		Bank clearings—Amount	
		1914	1914	1914	1914
June	100.00	100.0	100.0	100.00	100.00
July	100.68	104.2	102.7	102.44	97.44
August	99.28	108.9	107.6	70.88	86.66
September	96.38	109.5	109.3	71.66	98.58
June	100.00	100.0	100.0	.....	.....
July	100.36	102.2	102.2	.....	.....
August	97.80	102.7	104.4	.....	.....
September	95.11	101.7	104.5	.....	.....

TABLE VI—COMPARATIVE VARIATIONS OF BANK CLEARINGS 1914

	1914		1913		1912	
	Amount	Per cent	Amount	Per cent	Amount	Per cent
June	\$13,957,920,852	100.00	\$14,285,148,875	100.00	\$14,023,514,015	100.00
July	14,298,135,055	102.44	13,606,778,167	95.25	13,914,322,760	99.22
August	9,893,707,373	70.88	12,107,833,345	84.76	12,417,937,512	88.55
September	10,004,972,993	71.68	13,729,012,230	96.11	14,168,737,039	101.04
Total	\$48,154,736,273	.....	\$53,728,772,617	.....	\$54,524,511,326	.....

TABLE IX—GENERAL STATISTICS

	June and July	August and September	August and September in per cent of June and July, 1914	1914 in per cent of prior period
Am. Steam Rys., oper. revs., 1914	\$500,527,765	\$536,509,757	107.19	.....
Am. Steam Rys., oper. revs., av. 5 yrs.	535,111,718	573,000,699	107.08	100.0
Am. Steam Rys., oper. exp., 1914	352,736,052	357,250,688	101.28	.....
Am. Steam Rys., oper. exp., av. 5 yrs.	376,501,043	398,894,290	105.95	96.0
C. P. R. & Can. Nor., revs., 1914	23,785,993	23,149,504	97.32	.....
C. P. R. & Can. Nor., revs., 1913	27,774,492	27,411,242	98.69	98.5
Bank clearings, 1914	28,256,055,907	19,898,680,366	70.42	.....
Bank clearings, 1912-1813	55,829,763,817	52,423,520,126	93.90	75.0
Am. Elec. Rys., 137 cos., oper. revs., 1914	56,511,320	55,022,902	97.37	.....
Am. Elec. Rys., oper. revs., prior period	.....	.....	*100.00	97.4
Am. Elec. Rys., 120 cos., oper. exp., 1914	25,522,531	24,573,189	96.28	.....
Am. Elec. Rys., oper. exp., prior period	.....	.....	*98.00	98.2
Am. Elec. Rys., 88 cos., car miles, 1914	67,878,596	66,736,957	98.32	.....
Am. Elec. Rys., 88 cos., No. pass., 1914	496,220,556	484,594,410	97.66	.....

*Estimated normal figures.

fulness of clearings as an index of transactions are pointed out. In general, however, the clearing transactions should vary approximately as the variations in the entire volume of banking business. Table VI, based on figures prepared by the *Commercial & Financial Chronicle*, indicates the relation of July, August and September to June for each of the last three years. The months of June and July for each of the three years are approximately the same, but the months of August and September of this year show about 75 per cent of the transactions during these months in the previous years.

Bank clearings are probably the most widely-quoted barometer of trade conditions. We are not justified, however, in comparing these variations with those noted in the traction industry without important qualifications which it is not desirable to enumerate here.

Building operations are not as easily measured nor as fully reported as financial transactions or as utility earnings but Table VII, compiled from statistics appearing in the *Engineering News*, may be of interest in connection with figures given above.

It is interesting to note for the Eastern and Middle Western districts that the falling off did not occur until September, and this is accounted for probably on the grounds that building operations are usually financed before they are undertaken and that practically all the building begun in August and credited to this month is being done with funds which were made available before the first of August. Figures for the Southern district show very wide fluctuations, and this is partly accounted for by the fact that smaller totals are involved and any accidental variation makes, therefore, a large percentage variation. It is also quite possible that the unfortunate situation in which the cotton states found themselves immediately upon the beginning of the war in Europe affected the conditions in that district more seriously than elsewhere. The decrease from August to September was proportionately about the same as it was in the other districts.

Table VIII combines percentage relations from the preceding tables and indicates the extent to which business as indicated in the several comparisons decreased for the present year, between the months of June and September, and for purposes of comparison there are also included in this table similar figures for previous periods.

The Railways and the Manufacturers

Public Relations and Present Business Conditions Discussed in Boston by Guy E. Tripp

The speaker of the New England Street Railway Club on Jan. 21 was Guy E. Tripp, chairman board of directors, Westinghouse Electric & Manufacturing Company. Mr. Tripp first referred to the early days of electric traction, in which he took a part, and said that the equities which were in those days fondly imagined to be the reward of courage, industry, intelligence and pioneering risks have since been attacked by increasing wages and taxes, heavy rolling stock, non-paying extensions, etc., on the one hand and decreased purchasing power of the nickel on the other. The public has paid far less for thirty years of masterful work which produced a new era in human existence than it has paid for jimcrack novelties and patent medicines. That period was also a delusive one for the electrical manufacturing companies. Their original profits have since dwindled, and curiously enough the smallest profits are now to be found in the street railway department. Thus both the manufacturer and the customer are concerned in this problem, and their fortunes are closely linked.

One matter upon which they could co-operate to ad-

vantage would be in standards, particularly standards of cars and trucks. The various types now used and built require a large variety of types and sizes of motors, gears, etc., which prevents the manufacturer from operating his plant on the most economical basis. Again, a business has sprung up by which small manufacturers copy certain small parts of apparatus in large quantities and sell them at a very low price. The speaker believed it would be good business for the railway companies to buy their repair parts, not only of electrical apparatus but of cars, trucks, etc., from the original manufacturer. This would not only mean that these parts would be built under the direction of those responsible for the original apparatus but the closer contact brought about by such a trade would be of great benefit to both.

Mr. Tripp then urged co-operation on public questions. He also spoke of the great power of public opinion and the silence of some whose voices were most needed in such a situation. He had often thought that one reason why serious-minded property owners, big and little, fail to make a better showing on these questions is partly because they do not easily submit to leadership and partly because it meant some personal sacrifices. In comparison he cited the sacrifices which members of labor unions make in the case of strikes, and said it was this quality which makes labor unions stronger than their numbers.

In discussing the general business stagnation he said he thought it would have been just as bad or worse, even if there had been no war. The prevailing feeling in England and France when the war broke out was that a terrible situation confronted Europe but that great benefits would come to the United States; nevertheless, after six months the situation is just the reverse. For example, his English company is running at full capacity, while that in this country is operating at only between 50 per cent and 60 per cent of its normal output. The English company is not working on war orders but on the usual character of goods. The French works are running full time, but to a large extent on orders from the French war department. The Italian works are also running full time, and, judging from the very infrequent and vague news received through Austria, the Vienna company is enjoying usual prosperity. Therefore, so far as the interests of his own companies are concerned, they are very much more prosperous in Europe than in the United States.

It is true that some war orders have been received in this country, but the effect has been a great deal more than offset by the great disturbance of foreign exchange and the difficulty of handling our large indebtedness to Europe. The war has also obscured the effect of the recent anti-trust legislation and tariff reductions and will obscure the proposed bill for government ownership of a merchant marine, should such a bill pass Congress, which the speaker hoped would not be the case.

While anything that helps the export trade is good, prosperity still rests upon our home market. The speaker believes that this home market should be in a fair degree protected against foreign competition, even if we have to let the export trade take care of itself, and to that end he believed there should be a popular demand for a tariff commission, which can intelligently pass upon this complicated and delicate question. In the meantime the home industry needs a stimulant, and the most sensible way in which all can help at this time is to join hands in bringing about a better business state of mind. Crops have been plentiful and other conditions are good. The question is, how can railroads, mills and other industries be set in motion? If there should be a general movement and everybody should make a cautious start, taking a little but not too much, the result would be surprising.

COMMUNICATIONS

Causes of Corrosion of Water Pipes and Other Underground Structures

NEW YORK, Jan. 11, 1915.

To the Editors:

The article in a recent issue of the *ELECTRIC RAILWAY JOURNAL* on "Corrosion of Metals in Natural Soils" by Messrs. Scofield and Stenger recalls some very interesting personal experiences.

About 1887 the writer built the dam at First Beach for the Newport (R. I.) Water Company. This dam was built of sand which was pumped by means of a hydraulic pump. Underlying the upper strata of sand we found beds of peat ranging from 18 in. to 5 ft. in thickness. All about the region of the excavation we found springs which were thoroughly impregnated with sulphuretted hydrogen. The corrosive effects of this were so great that shovels left sticking in the sand would be so badly corroded in a week as to become useless. Of course this action extended to underground pipes which were very rapidly pitted and corroded by the sulphuretted hydrogen. I have seen pipes taken out at Newport, after having been in the ground only three or four years, on which the effect of the corrosion had very much the appearance of that produced by electrolytic corrosion. A very similar action at Swampscott, Mass., was caused by salts in the soil. Both of these cases occurred before electric railways were built.

At Utica, N. Y., we found electrolytic action upon iron located in the ground near the bridge approach at New York Mills. This was caused by currents generated from iron filings and old iron dumped on each side of the bridge abutment. Acting chemically upon this iron was the acid which was discharged into the canal water from several neighboring factories. This, of course, created a wet battery. We made tests when the power house was shut down at night and found currents under emfs up to 1.2 volts. The currents flowed from the ground into the rail, and we were several months in determining their source. Finally we found it to be as above.

While living at Elmira, N. Y., the writer made a detailed electrolytic survey. As the local company owns the natural gas plant, the artificial gas plant, the water works, the electric light plant and the street railways, the survey at Elmira was probably one of the most fair and most logical ever made. It was made to ascertain the real conditions existing in order that the company's property might be fully protected. During this investigation we discovered a number of very peculiar conditions, but, although our track was in very bad shape in many sections and there was a large amount of current escaping, we found very little action upon the pipe lines of any of the companies.

Returning to the experience in Newport and Swampscott, the outcome of the matter was that we laid cement pipes all through these towns, taking particular care not to expose the metal at the joints. We found, particularly in Newport, that some sections of the pipe were much more likely to be affected than others. It has been my own experience that, in many places where it was claimed that pipes were being injured by electrolysis from stray railway currents, the damage was due more to the condition of the soil than to the stray currents. One of the best plans for ascertaining whether pipe lines are being affected or not is to open up the lines at approaches to bridges. I found that the stray currents are inclined to leave the pipe at such bridge approaches and to follow the course of the stream. In consequence if there is any electrolytic

action taking place on these pipe lines, it can be almost invariably detected there.

I am interested to learn that the very exhaustive tests made by Messrs. Scofield and Stenger corroborate the results of my own experience.

W. W. COLE, Consulting Engineer.

Calculation of Starting Resistances for Railway Motors

PURDUE UNIVERSITY

LAFAYETTE, IND., Jan. 15, 1915.

To the Editors:

The article bearing the above title, written by F. Castiglioni and appearing in the issue of the *ELECTRIC RAILWAY JOURNAL* for Dec. 26, 1914, sets forth a very interesting graphical method of predetermining the proper resistances for use in the control of railway motors using series-parallel connections. This method will doubtless simplify the work of properly designing resistances for such control, and is therefore of primary interest to the manufacturer of railway equipment. While the operating engineer should make a very careful and continuous study of the proper resistance adjustments for the rolling stock under his supervision in order that the maximum of economy may be secured with the best possible service and minimum maintenance, yet it is the opinion of the writer that this cannot be done to advantage by any such method as indicated in the article.

The problem is not unlike that of determining the proper taps to be used on the starting compensator of an induction motor in order to apply a standard motor to the particular requirements of a single installation to best advantage. These taps may be worked out ever so carefully in the design room and yet it will be found, when the equipment is installed, that some peculiarities of the load or variation of voltage from that assumed in the design will necessitate the shifting of compensator taps if good service is to be rendered.

With the railway motor installation the possibility of absolute predetermination of control resistances is even more remote, since the variables involved in the installation are very much more numerous and complex. This problem is similar to that of the selection of proper gear ratio for a given equipment and service. I believe that railway officials will agree that the equipment which has been continued for a long period of time in service with the identical gear ratio that was specified when the installation was made is the exception to the rule.

Furthermore, the resistances of grids, as now manufactured for the control of railway motors, will vary in magnitude over a very wide range with the temperature at which they are operated, which may change from that of a cold winter morning to that corresponding to nearly red heat. Recent tests show more than 25 per cent change in resistance with a much less range of temperature than indicated above. This does not mean that no attempt should be made to predetermine the necessary resistance desirable for a given equipment and service, but it is merely an additional argument against the waste of too much time in preliminary calculations and high degrees of accuracy as contrasted with a simple test after the apparatus is installed on the car, involving the reading of an ammeter and the shifting of connections or resistance grids.

It is another case of the old story of theory versus practice, and, as in most cases where these two factors are in competition with one another, good engineering judgment in the field must be exercised to determine the extent to which theory and practice are to be consulted in the problem at hand.

C. FRANCIS HARDING,
Professor Electrical Engineering.

American Association News

President Woodrow Wilson, Senator John W. Weeks and Representatives Swagar Sherley and A. J. Montague Will Speak at Washington Meeting—Details of Association Activity Are Given

THE WASHINGTON CONFERENCE AND DINNER
BY E. B. BURRITT, SECRETARY AMERICAN ELECTRIC RAILWAY ASSOCIATION

With President Wilson as one of the speakers at the mid-year meeting and dinner the program is, by all odds, the most attractive that the association has yet offered to its membership, since, in addition to the President, addresses are assured from former Governor A. J. Montague of Virginia; Hon. Swagar Sherley of Kentucky, one of the administration leaders in the House of Representatives; Senator John W. Weeks of Massachusetts who, besides representing the "Bay State" in the Senate of the United States, where his work in connection with the currency bill won him universal applause, was a pioneer in the financing of electric railways and a banker of national reputation; N. C. Kingsbury, vice-president of the American Telephone & Telegraph Company, whose remarkable work for this organization has entitled him to be considered as one of the leading exponents of publicity as applied to corporation affairs; Colonel T. S. Williams, head of the great Brooklyn Rapid Transit System, who assisted in drafting the code of principles which he will discuss; C. L. Henry, a veteran in the development of interurban railways; C. C. Peirce, who speaks for the Manufacturers' Association, and C. Loomis Allen, president of the American Electric Railway Association. In addition, Arthur Williams, president of the American Museum of Safety and general inspector of the New York Edison Company, will announce the winner of the Anthony N. Brady medal, offered by the museum, through the kindness of the family of the late Anthony N. Brady, to the electric railway which has done the most during the year to conserve the life and health of its passengers and employees.

There will be two sessions of the conference proper, the first at 10 o'clock in the morning, at which Messrs. Kingsbury and Williams are to speak, and the second at 2 p. m., to be addressed by Senator Weeks, who is to be followed at 3 o'clock by the President.

The dinner takes place at 7 p. m. at the New Willard Hotel, where the conference proper will also be held. The dinner committee has perfected plans which indicate one of the most enjoyable events that has ever

been held under the auspices of the allied associations. The New Willard Hotel has a reputation for serving handsome banquets, and the management in this case has promised to eclipse its previous efforts.

Reservations at the hotel and applications already received for tickets indicate a large attendance. A special train will be run from New York leaving at 12:30 a. m. on Jan. 29 and arriving in Washington at 7 a. m., in ample time for the first session of the conference. The New York train is in charge of a committee consisting of Bertram Berry, J. A. Kucera, H. G. McConaughy and H. C. Clark. Transportation committees have been organized in other cities, the chairmen being: Chicago, H. J. Kenfield, *Electric Traction*; St. Louis, Edwin B. Meissner, St. Louis Car Company; Cincinnati, D. H. Ackerson, Cincinnati Car Company; Cleveland, L. G. Parker, Cleveland Frog & Crossing Company; Pittsburgh, M. E. Johnson, Pittsburgh Steel Company; and Philadelphia, Thomas Cooper, Westinghouse Electric & Manufacturing Company.

The officers of the association are anxious to make the coming meeting and dinner an event of note. They believe that the opportunity is offered for presenting to the country the side of the electric railways and that the publicity to be obtained will be of incalculable benefit to the industry. The executives of the member companies are responding to the appeal for a large attendance and there seems to be reason to believe that the optimistic views which are held by the officers will be amply fulfilled.

A noteworthy guest list consisting of high officials of the United States government has been prepared and many acceptances are being received. Secretary Tumulty and others of the President's colleagues have cooperated heartily with the association committee in arranging the details of the program.

In view of the great interest manifested in the address of President Wilson and the limited capacity of the room in which the meeting will be held, it has been decided that admission will be by badge, and railway men and manufacturers attending the meeting are urged to register upon their arrival in Washington at the association's registration bureau in the New Willard Hotel. Upon registration badges will be distributed which will admit to the meeting.

Program Mid-Year Meeting and Dinner

NEW WILLARD HOTEL, WASHINGTON, D. C.
JANUARY 29, 1915.

Morning Session

10:00 A. M.—"THE CODE OF PRINCIPLES," T. S. Williams, president Brooklyn Rapid Transit System, Brooklyn, N. Y. Discussion by Guy E. Tripp and M. C. Brush.

11:30 A. M.—"PUBLIC SERVICE AND PUBLICITY," N. C. Kingsbury, vice-president American Telephone & Telegraph Company, New York, N. Y. Discussion by W. Caryl Ely, E. G. Connette and Wilbur C. Fisk.

Afternoon Session

2:00 P. M.—"ELECTRIC RAILWAYS FROM FINANCIAL VIEWPOINT," Hon. John W. Weeks, United States Senator from Massachusetts. Discussion by J. H. Pardee and J. D. Mortimer.

3:00 P. M.—Address by the President of the United States.

7:00 P. M.—JOINT DINNER A. E. R. A.—A. E. R. M. A. C. Loomis Allen, president of the American Electric Railway Association, presiding.

ADDRESS—C. C. Peirce, vice-president American Electric Railway Manufacturers' Association.

ADDRESS—Hon. Swagar Sherley, Representative in Congress, Fifth District of Kentucky.

ANNOUNCEMENT OF WINNER OF THE ANTHONY N. BRADY MEDAL—Arthur Williams, president American Museum of Safety.

ADDRESS—Hon. A. J. Montague, former Governor of Virginia and Representative in Congress from the Third District of Virginia.

ADDRESS—C. L. Henry, first vice-president American Electric Railway Association.

MANUFACTURERS' ASSOCIATION 1915 CONVENTION TRANSPORTATION COMMITTEE

Bertram Berry, Heywood Brothers & Wakefield Company, 516 West Thirty-fourth Street, New York, chairman; H. G. Barbee, Pennsylvania Steel Company; Edwin Besuden, Jewett Car Company; Warren L. Boyer, Bemis Car Truck Company; R. M. Campbell, Detroit Graphite Company, 135 Broadway, New York; H. C. Clark, editor *Aera*; Thomas Cooper, Westinghouse Electric & Manufacturing Company; Henry C. Evans, Lorain Steel Company; L. E. Gould, ELECTRIC RAILWAY JOURNAL; Frank N. Grigg, Transportation Utilities Company; Arthur Hale, Griffin Wheel Company; W. S. Hammond, Jr., Consolidated Car-Heating Company; Ross F. Hayes, Curtain Supply Company; Frank Johnson, Ohio Brass Company; J. E. Johnson, Laconia Car Company; H. J. Kenfield, *Electric Traction*; W. R. Kerschner, W. R. Kerschner Company; H. N. Latey, General Electric Company; J. C. McQuiston, Westinghouse Companies; F. L. Markham, J. G. Brill Company; Edwin B. Meissner, St. Louis Car Company; S. W. Midgley, Acme Supply Company; Frank D. Miller, National Brake Company, Inc.; Ralph Moore, General Electric Company; W. I. Ohmer, Dayton Fare Recorder Company; A. H. Sisson, Southern Car Company; H. M. Sperry, General Railway Signal Company; Frank Steffner, Chattanooga Armature Works; D. A. J. Sullivan, Galena-Signal Oil Company; Langdon B. Valentine, Valentine & Company.

PUBLIC SERVICE SECTION INAUGURATES NOVEL PROGRAM

The regular meeting of the Public Service Railway Company Section, held in Newark on Jan. 21, was attended by 300 or more men from all parts of the State of New Jersey. Twenty applicants were elected to membership. A letter from Association President C. Loomis Allen, complimenting the Section upon its progress and expressing good wishes for the future, was read. In this letter Mr. Allen directed attention to the code of principles and suggested that all members of the Section familiarize themselves with it. Handsome loose-leaf notebooks, containing data sheets and blank pages, were issued to the members of the Section. The first sheet contained the text of the code of principles. The purpose in distributing these notebooks was to encourage systematic filing of data, especially such as relate to the work of the Section.

J. L. O'Toole, publicity agent, delivered a scholarly and interesting address on the development of transportation facilities, particularly in the State. He called attention to the meagerness of historical information on the subject, as "transportation men had been too busy to write history." He used a large chart, showing the trunk, limbs, branches and twigs of a tree which represented Public Service and its 115 constituent parts. Mr. O'Toole stated that the local history began with a stage line between Burlington and Perth Amboy in 1732. This formed a part of a boat-stage route between Philadelphia and New York. In 1765 a competing line was put in and another competitor entered the field in 1766, driving out the others by using spring seats.

The first horse car appeared in the State in 1859, and in the early seventies a cable line was tried in Newark unsuccessfully soon after the first introduction of the system in San Francisco in 1873. In 1883 an ordinance was passed in Newark authorizing the use of electricity, and electric service was actually introduced in 1890. Since that year progress has been rapid and, since the opening of the "fast line" binding the northern and southern sections of the system, the Public Service Railway has been a united whole. It now comprises 876

miles of track, uses more than 2400 cars and serves 2000 square miles of territory and 2,100,000 population.

R. E. Danforth, general manager, began the educational program outlined in an earlier issue of this paper, which is to be known as "Public Service Economics." He gave exact information regarding the operation of the property and showed how the cost of service is divided. He explained the unusual items of operating cost and showed how co-operation could effect savings. He showed how nearly the estimated unit operating cost for 1914 had been reached and what this cost should be for 1915. He explained and illustrated the methods used by the company for arranging data for ready reference and urged the use of system in such matter by the members of the Section. This talk was introductory to a series which will continue for many months.

COMING COMMITTEE MEETINGS

Jan. 25, New York, University Club, dinner and conference of the American Association committee on public relations, Thomas N. McCarter, president Public Service Railway, chairman.

Jan. 26, 27, New York, 10 a. m., meetings of sub-committees of the joint committee on block signals, J. M. Waldron, Interborough Rapid Transit Company and J. W. Brown, Public Service Railway, co-chairmen. The plan of these meetings, originally scheduled for Jan. 4 and 5, was described in the issue of the ELECTRIC RAILWAY JOURNAL for Dec. 26, page 1393.

Jan. 27, New York, 10 a. m., Engineering Association committee on equipment, W. G. Gove, superintendent of equipment Brooklyn Rapid Transit Company, chairman. (See outline on page referred to above).

Jan. 28, New York, 10 a. m., sub-committee on specifications for line materials, of the Engineering Association committee on power distribution.

Jan. 28, Washington, New Willard Hotel, 10 a. m., American Association executive committee, C. Loomis Allen, Allen & Peck, Inc., chairman.

Jan. 29, Washington, New Willard Hotel, hour to be announced, Claims Association executive committee.

The Engineering Foundation

The Engineering Foundation, inaugurated by the United Engineering Society, is the name given to a fund to be "devoted to the advancement of the engineering arts and sciences in all their branches, to the greatest good of the engineering profession and to the benefit of mankind." The administration of this fund will be entrusted to the Engineering Foundation Board, elected by the trustees of the United Engineering Society and composed of eleven members, nine from the American Society of Civil Engineers, the American Society of Mechanical Engineers, the American Institute of Mining Engineers, and the American Institute of Electrical Engineers, and two chosen at large. The initial gift for the Engineering Foundation is from a noted engineer whose name will be announced at the inauguration ceremonies on Jan. 27, at 8:30 p. m. in the auditorium of the Engineering Societies' Building, New York. The speakers at this inauguration meeting will be: Gano Dunn, president of the United Engineering Society and past-president of the American Institute of Electrical Engineers; Dr. Henry S. Pritchett, president of the Foundation for the Advancement of Teaching; Dr. Robert W. Hunt, past-president of the American Institute of Mining Engineers; Dr. Alexander C. Humphreys, past-president of the American Society of Mechanical Engineers.

Equipment and Its Maintenance

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

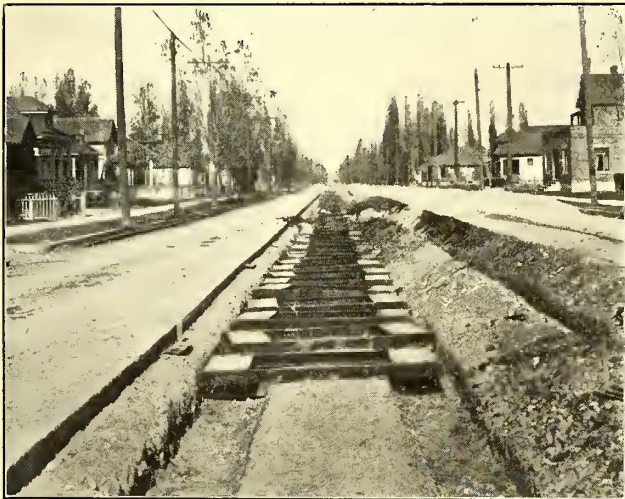
(Contributions from the Men in the Field Are Solicited and Will be Paid for at Special Rates.)

Steel Tie Construction in Electrically-Warmed Concrete

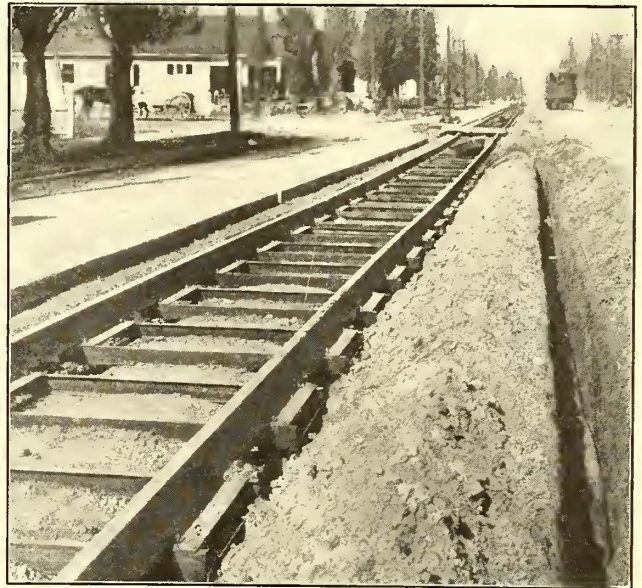
BY JULIAN M. BAMBERGER, VICE-PRESIDENT SALT LAKE & OGDEN RAILWAY

During November, 1914, under the direction of the writer, the Salt Lake & Ogden Railway installed 2937 ft., measured as single track, of concrete track construction, consisting primarily of 7-in. 80-lb. T-rails Pennsylvania Section No. 227 and the International Steel Tie Company's box-girder ties, 32-in. over all,

mesh, the latter being used as reinforcement against expansion, and was applied before the initial set of the foundation concrete. The standard depth of the foundation concrete was 6 in., except between running rails, but the depth of the beams under the rails varied from 8 in. to 11 in., in accordance with the sub-soil conditions. It will be observed that the roadway along this street conforms to the construction between the running



SALT LAKE & OGDEN RAILWAY—VIEW OF TRENCH READY TO RECEIVE THE STEEL TIES

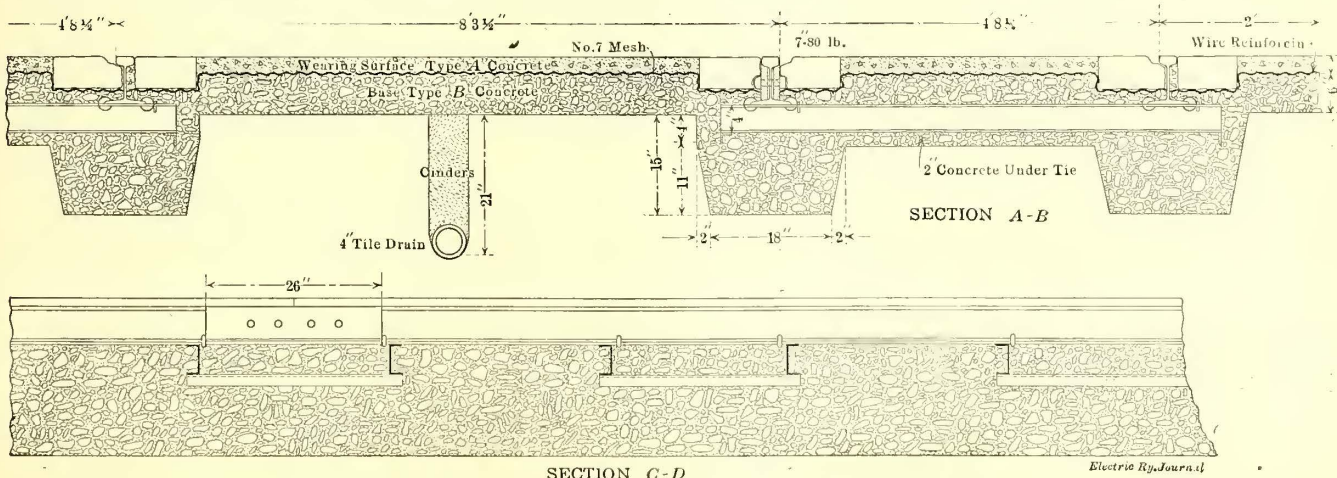


SALT LAKE & OGDEN RAILWAY—RAILS FASTENED TO TIES AND CLIPS IN PLACE; TILE DRAIN AT RIGHT

spaced 5 ft. centers. Wooden ties were used only under special work. As shown in the accompanying drawings, two classes of concrete were used, as follows: Type "A" for topping, containing 1 part cement, 1½ parts sand and 2½ parts of gravel, graded to pass a ¾-in mesh; Type "B" for foundations, containing 1 part cement, 3 parts sand and 6 parts of gravel, graded to pass a 2-in. mesh. The top concrete was laid to a depth of 2½ in. on a screen of No. 7 American Steel & Wire

rails, and that the only other paving comprises the nose and plain blocks of sandstone which sandwich each rail.

The accompanying halftones will give a good idea of the manner in which this work is done. The first halftone shows the excavation ready to receive the ties and the trench in which the drain tile is laid. The second view shows the rail fastened to the ties and the clips all in place, before surfacing, and with the tile drain in the devil strip in process of laying. The third and

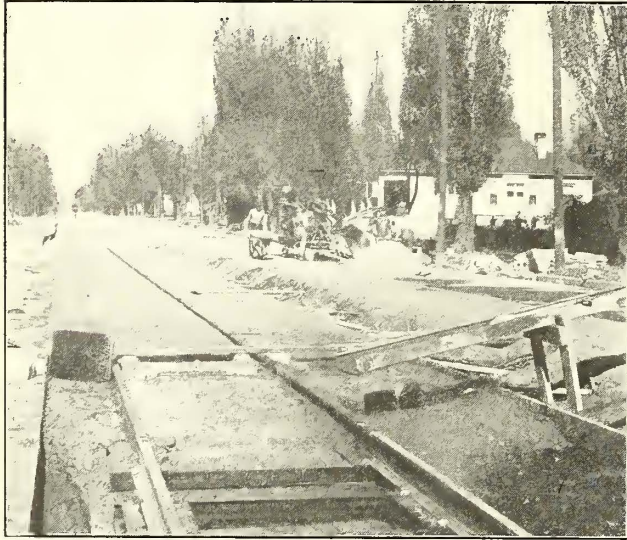


SALT LAKE & OGDEN RAILWAY—STANDARD CONCRETE TRACK WITH STEEL TIES

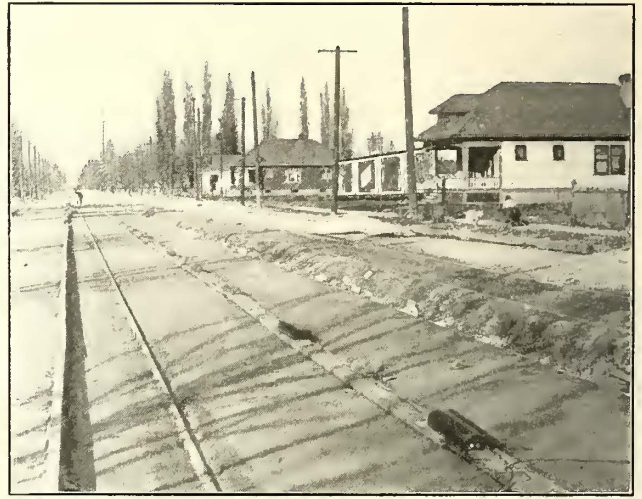
fourth views show the actual process of laying concrete. Traffic was maintained in the dirt track while the concrete construction was being placed. To make this possible large chutes were constructed, and these were moved only during the time cars were actually passing. The concrete was poured through these chutes direct from the mixer to the track. The topping, however, was wheeled in barrows from a smaller mixer. Previous to commencing the work a supply of sand and gravel had been dumped along the side of the street so that there was very little wheeling of raw material.

The fifth view shows the finished job, with Consol-

TRACK LABOR COSTS	
Removing old track, per lineal foot.....	\$0.070
Grading (elevation of old track about 6 in. higher than new track) .....	.487
Drain .....	.054
Laying and blocking up track.....	.197
Bonding .....	.014
Placing paving block and reinforcement.....	.109
Concreting:	
Base .....	.282
Wearing surface .....	.156
Total	\$1.369
Wage scale:	
Laborers	22½ cents to 27¼ cents per hour
Finishers	30 cents per hour
Engineers	35 cents per hour
Block setters	55 cents per hour
Foreman	50 cents per hour



SALT LAKE & OGDEN RAILWAY—WORKING ON ONE TRACK WHILE MAINTAINING TRAFFIC ON THE OTHER



SALT LAKE & OGDEN RAILWAY—ELECTRIC HEATERS KEEPING THE CONCRETE WARM

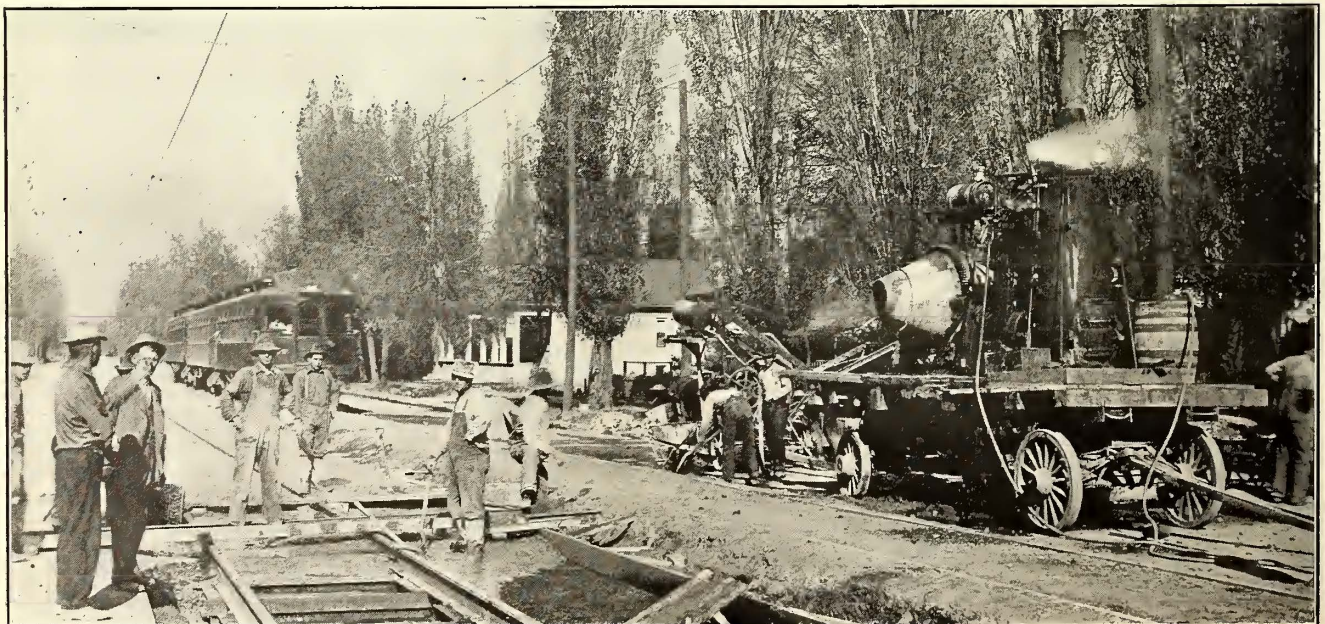
idated Heater Company electric car heaters, connected ten in series on 720 volts, each placed at intervals of 10 ft. Canvas was stretched over the whole and the heaters were placed in circuit with the trolley wire by means of a fishpole connection in order that the entire mass of fresh concrete might be kept warm.

The detail labor costs of this job per running foot follow in the next column. The tracks were laid 15 ft. center to center.

Except for the cement the material costs were very nominal, the various grades of washed sand and gravel

being obtained from the bed of the Weber River near Ogden, where we constructed a temporary spur track to enable us to load by steam shovel. We contemplate the building of an additional 2 miles of this construction in the spring.

At a meeting in the general office of the Columbus Railway, Power & Light Company, Columbus, Ohio, recently, S. G. McMeen, president, addressed more than 100 of the company's employees who are members of the various committees in the "safety first" movement.



SALT LAKE & OGDEN RAILWAY—CONSTRUCTION VIEW, SHOWING ALSO THE CONCRETE MIXER MOUNTED ON A WAGON

Location of Trolley Wire on Curves—IV

BY S. L. FOSTER, CHIEF ELECTRICIAN UNITED RAILROADS OF SAN FRANCISCO

Common Chord Method of Locating Trolley Wire on Curves—The correct location of the trolley wire on curves can be found in an even easier and simpler manner than by the last derived formula, namely, by the use of a common chord of dimension $2\sqrt{K}$. This method puts the whole matter safely into the hands of the foreman, after the exact length of this chord has been calculated for him, and makes him independent of tables, blueprints and figuring.

It has just been seen that the correct distance that the trolley should be moved inside the center of the track on curves can be expressed by the equation

$$\text{Versed sine} = R - \sqrt{R^2 - K} \tag{13}$$

Where R = Radius of curvature

K = A constant when the dimensions and equipment of the cars, the height of the trolley wire and the track gage are constant.

In Fig. 7 we have the following

DCA = An arc of a center line of a track curve

R = Radius of curvature

$V.S.$ = Versed sine or distance that the trolley wire should be moved inside the center of the track for least friction

Then

$$AB = \frac{1}{2}AD = \sqrt{R^2 - (R - V.S.)^2} \tag{16}$$

$$\begin{aligned} 2AB = AD &= 2\sqrt{R^2 - (R - V.S.)^2} \\ &= 2\sqrt{V.S. (2R - V.S.)} \end{aligned} \tag{17}$$

Substituting the value of $V.S.$, as given in equation (13), in equation (18) we get:

$$\begin{aligned} \text{Chord } AD &= 2\sqrt{(R - \sqrt{R^2 - K})(2R - R + \sqrt{R^2 - K})} \\ &= 2\sqrt{K} \end{aligned} \tag{18}$$

This means that from constant K for a given car, height of trolley and track gage a length can be found for a chord common to all curves, the versed sine at whose center will be the distance the trolley should be set in for least friction, if there is no elevation of the outer rail. If there is elevation of the outer rail the versed sine obtained by this common chord method should be increased by $\frac{eh}{g}$

where

e = Elevation of outer rail

h = Height of trolley wire above top of rail

g = Gage of track or distance between the two rails of one track.

Example: Taking the data from the example just given we see that after determining K as 240.85 the length of the common chord is readily found from $2\sqrt{K}$ to be 31 ft. $\frac{1}{2}$ in.

A tape line 31 ft. $\frac{1}{2}$ in. long with marked center will locate all curve trolley wires in the city for the linemen if the cars, track gage and height of trolley wire are uniform.

The men have only to stretch the line as a chord of an arc of the rail curve where it is uniform in the central part of the curve, to note how far away from the rail the center point on the line is, and to use this for plumbing the trolley inside the center of the track.

If there is elevation of the outer rail that must be allowed for, furnish the men a track level and constant multiplier. For example, if the trolley is uniformly 19 ft. above the rail and the gage is 4 ft. $8\frac{1}{2}$ in. the elevation should be multiplied by 4.035 or

roughly, 4, to get the distance to move the trolley wire in addition to that found necessary from the common chord method as due to the car and trolley height alone.

Example: If 5 in. is found by the level to be the elevation of the outer rail $5 \times 4 = 20$ in. is the distance the trolley should be moved in addition to the amount found by the stretched cord. This on a 150-ft. radius curve would be about 10 in., or a total of 2 ft. 6 in. is the distance the trolley should be moved in this case.

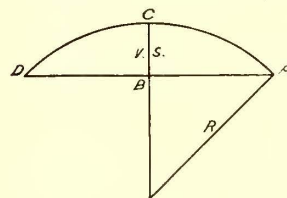


FIG. 7—COMMON CHORD METHOD

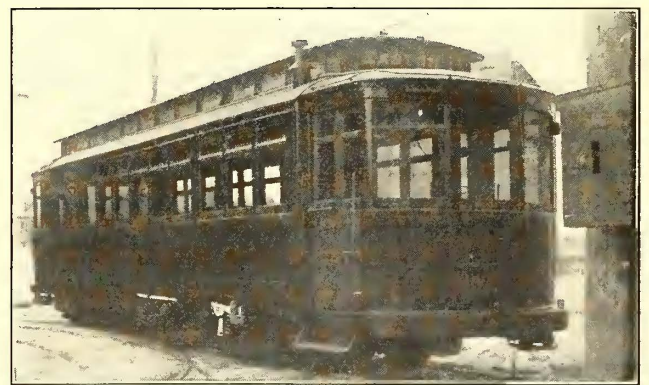
The lineman, using a stick equal in length to half the gage with inches and subdivisions marked on it and with the common chord length, will thus be enabled to do rapid and accurate work without any tables, blue-prints or mathematical assistance.

If there is more than one type of car on the system, the line foreman should be given a chord length suited to each type of car. If more than one type of car passes around the given trolley curve the average of the different chord lengths appropriate for the different types of cars and their relative number should be used in locating the curve.

Brackets for Carrying Lifting Jack Under Side Sill

BY HARRY BRANSON, SUPERINTENDENT OF EQUIPMENT LEHIGH VALLEY TRANSIT COMPANY, ALLENTOWN, PA.

The accompanying halftone shows the scheme which was devised by the writer for mounting the lifting jack and lever with which each of our cars is equipped. The jack is of 15-ton capacity and is swung from a side sill of the car by means of brackets made of $1\frac{1}{2}$ -in. x $\frac{1}{2}$ -in. strap iron. The base of the jack rests on an L-shaped hook which passes through the opening at the bottom. The load end of the jack rests on a second and similar hook fitted with a swinging latch which



JACK AND LEVER SUSPENDED FROM SIDE SILL OF LEHIGH VALLEY TRANSIT COMPANY CAR

holds the jack quite rigid but allows it to be easily removed in case of need.

The wooden lever employed is of standard length and has a screw-eye attached near the small end which rests in a hook fastened to the car. The jack end of the lever fits into a loop made of $\frac{3}{4}$ -in x $\frac{1}{8}$ -in. banding iron which holds it in position. The entire labor and material cost for mounting this equipment did not exceed 80 cents per car.

Sales of Scrap Metals

BY J. P. ALEXANDER

The average scrap value of copper and brass sold during a period of four years ending 1911, for an electric street railway averaged 20 cents per pound. The fact that the present price of copper is 11 cents shows that the policy of the larger roads to dispose of scrap materials at regular intervals during the year is wise, because the ups and downs of the market are averaged and the money derived can often be made to earn enough to even up any losses occasioned by not holding it. When prices go to unreasonable figures, however, it seems to be the policy of all roads to unload, if possible, before a drop in prices occurs.

As a rule, old rails and mixed railroad scrap vary enough in value to be held, though opportunities often occur where such scrap can be handled to some advantage on low market, as when old rails are taken direct from the tracks to the railroad car. In this case the company saves the unloading, storing and reloading, which for rails may run as high as 50 cents per ton for every gross ton moved. This price is with mid-winter hand loading, with crews of from ten to fifteen men.

The cost of handling brass and copper scrap runs about 15 cents per 100 lb. handled. This is on the basis of collecting and delivering the scrap at one point. It appears high as compared with rails or mixed scrap, yet it is to be remembered that the pieces of these metals are smaller, and that the cost of carrying the sale is the same as for more extensive tonnage sales.

The following are actual costs of loading the materials mentioned from the points of collection to adjacent cars. Just under these costs I have placed the cost of handling copper and brass scrap for comparison. The cost of handling, it will be seen, runs under the cost of loading railroad scrap and rails:

	COST OF LOADING SCRAP		Basis of Value
	Per Gross Ton	Per \$100 Worth	
Old car wheels.....	\$0.245	\$1.68	\$22.50 per ton
Mixed railroad scrap metals.....	0.897	6.19	14.50 per ton
Old rails.....	0.475	2.77	17.50 per ton
Copper and brass.....	3.00	1.00	0.15 per lb.

In the case of the foregoing figures, the scrap car wheels, mixed railroad scrap and rails were all loaded by hand, and the distance traversed was from 10 ft. to 40 ft. The figures are conservative, and as they are for cold weather loading, they also represent a maximum cost.

As the "scrap business" is carried on to a great extent by foreigners, and classes of collectors who are constantly going beyond the limit of the law, all sales where such people become bidders are best handled on a strictly cash basis, and with an exact agreement in writing as to the details of each sale.

A form that the writer found useful for receiving prices on material for sale, subject to the "OK" of the legal advisor of the sellers, is shown in the next column, at the top.

A person reading this might consider the document too extended, yet the writer has found it hardly sufficient to cover all the points that come up in a sale. If any reader adopts it to collect prices on material, he will do well to stick to every detail of it, for it covers almost every point of dispute that can be brought up, where the seller desires to get several competitive bids and make the award to the highest bidder.

As mentioned above, this form, before use, should receive the "OK" of the legal advisor of the sellers, as the laws of contracts have in some states legal loopholes which the form may not cover entirely.

Every paper in connection with a sale, from the price sheets to the memorandum of weights, should be kept

Gentlemen:
 The.....Traction Company will hold a sale on Feb. 21, 1915, at 2 p.m., when the following approximate amounts of scrap metals will be disposed of:
 Located at Blanktown carhouse.
 Material can be inspected from 2 p.m. to 5 p.m. any week day.

Approximate weight, pounds	Metals	Place	Date
2500	Copper wire, bare.....	Please insert prices you will offer in column at right, per 100 lb.	
1500	Copper scrap	_____	_____
1300	Brass, red	_____	_____
500	Brass, yellow	_____	_____
300	Trolley wheels	_____	_____
100	Copper turnings	_____	_____
100	Brass turnings	_____	_____
100	Phosphor bronze	_____	_____
50	Old rubber	_____	_____
100	Old leather	_____	_____
50	Old rope	_____	_____
125	Tin foil	_____	_____
50	Scrap lead	_____	_____

The company wishes it understood that the prices you insert will be exact prices for the material as it stands, with no allowances. The material is to be weighed on the company's scales, after the successful bidder is satisfied with their accuracy. Bidders will be expected to name highest figures they will pay for any item, and will also be expected to take any or all awarded them and remove same before the date.....1915, settlement being made by cash or equivalent certified check on the prices named in the bid, no matter how the market may change after date of sale to date of taking away.

The acceptance at the bottom of this letter must be signed and witnessed before the prices named are considered. The company reserves the right to reject any or all bids or stop the sale to avoid controversy.

The successful bidder will be expected to furnish two laborers to help handle the material to the scales and load same, and one representative to check the scale weights. Boxes, containers, wagons, trucks or cars to be provided at such times, and places, as shall be agreed on in accompanying memorandum to avoid delay and unnecessary expense.

BLANK TRACTION COMPANY,
 Per.....

ACCEPTANCE:

The undersigned has placed the prices given above as a bid for the material to be sold and hereby agrees to the terms mentioned above.

(Signed).....
 BLANK FOUNDRY & MANUFACTURING COMPANY.

Witness:

and filed, as anyone who handles scrap sales is sure sooner or later to be accused of dishonesty by unsuccessful bidders. He will need all the figures and details to clear himself.

Sheets or a record book ruled as follows will be found useful in recording weights. A permanent record book of sales is recommended. Weights are inserted to show how the columns are extended:

		Place.....		Date.....		AMOUNT OF CREDITS		Total	Credit Acct., No.		
Copper: Dept.	Kind of Material	Gross Wgt., Lb.	A	B	Tare, Lb.	Net Wt., Lb.	Price, Cents			Shop	Line
Shop...	Wire	350			40	310	15				
		500			50	450	15	\$196.50			
		600			50	550	15				
	Copper scrap	450			50	400	15	60.00	\$256.50	36	
Line...	Wire	600			50	550	15				
		400			30	370	15				
		300			50	250	15		\$170.50		
	Copper scrap	400			50	350	15		52.50	\$228.00	23
Shop...	Red brass	250			50	200	11	22.00			
		300			40	260	11	28.60		36	
		250			50	200	10	20.00		70.60	
Line...	Red brass	300			50	250	11				
		200			60	140	10		41.50	41.50	
		200			60	140	10				
Miscellaneous: Shop...	Rubber	150			25	125	10	12.50		12.50	32

Summary: Total of Shop credits, Acct. No. 32.....	\$12.50
Total of Shop credits, Acct. No. 36.....	327.10
Total of Line credits, Acct. No. 23.....	269.10
Total.....	\$608.70

The metal prices used are taken for illustration and are not prevailing prices to-day.

If the foregoing sheet is made large enough, it will take all figures in any ordinary sale. It will be found an excellent practice to have representatives of the company selling material put their initial in column "A" and the representatives of the buyer put his initial in column "B" after every weight taken.

Most companies have to use portable scales of 1000 lb. capacity or less to handle such sales, and, as much of the material is handled in boxes, a tare weight is often used. Writing the word "no" in the tare column will indicate: "no tare to be deducted," and thus prevent confusion. Confusion is something that is not wanted in a "scrap" sale, as it is usually a cash sale, and often there is no chance to check back and see where the mistake was made.

The weights should be taken accurately and the figures checked by both seller and buyer.

As scrap material accumulates at the rate of about \$50 per car run per annum, the amount of revenue from this source is certainly worthy of the trouble and cost of handling.

Linemen as Tight-Wire Walkers

On the system of the Cumberland County Power & Light Company, which operates the electric railway lines in the Portland district of Maine, three of the transmission lines leading from the company's hydroelectric plants cross the Stroudwater and Presumpscott Rivers

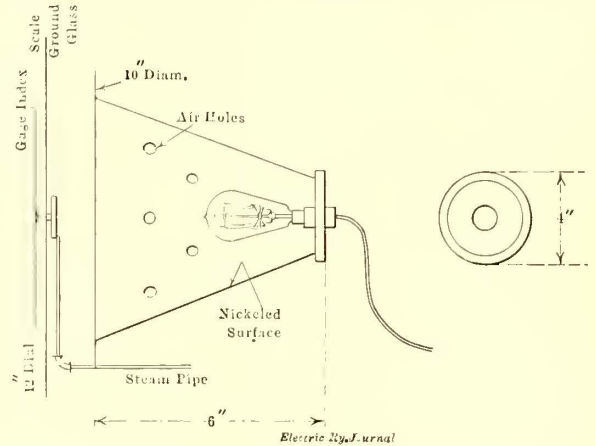


LINEMAN WALKING OVER CABLE TO SAVE A LONG WALK ON THE GROUND

at points where a long detour by road is required to follow the lines on foot in inspection work. To enable the inspectors to avoid these tiresome detours, the rivers are spanned by stranded steel cables about 1/4 in. in diameter, as shown in the accompanying illustration. The cables are spaced 36 in. apart in an equilateral triangle and are attached by 1-in. eyebolts to double cross-arms fastened to strongly guyed poles at each end of the span, which is about 150 ft. in the case shown.

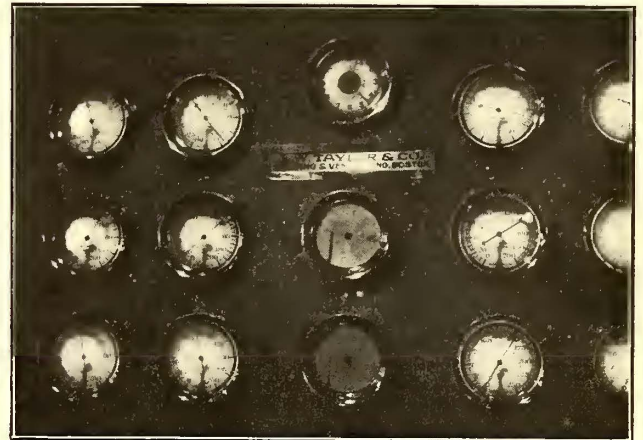
Lighting a Gage Board from Behind

An unusually effective method of lighting a gage board is illustrated in the accompanying halftone and sketch. The various steam and vacuum gages in the plant are mounted on a marble board on which each



SKETCH SHOWING LIGHTING OF GAGE BOARD FROM BEHIND

gage is equipped with an individual 30-watt incandescent lamp. Each lamp is mounted about 6 in. behind the dial in a 4-in. circular brass nickel-plated reflector screwed to the orifice of a conical holder, which covers the registering mechanism in place of the usual solid metal plate. Holes drilled in the holder provide for the



VIEW OF GAGE BOARD WITH LIGHTING FROM BEHIND

dissipation of heat radiated by the lamp. The gages can each be read with ease at a distance of from 50 ft. to 75 ft. from the board. The lamps are wired on the local 110-volt service mains. It is desirable to bore a number of holes in the conical reflector in order to prevent cracking the scale glass by the heat of the lamp.

The tabulations of the State Tax Commission of Ohio show that the value of the real estate owned by the street railway, suburban and interurban companies in that State aggregates \$9,092,020. The valuation placed on the realty of the Cleveland Railway is \$2,076,680, while that of the Cincinnati Traction Company is \$1,352,960. Real estate of the Northern Ohio Traction & Light Company is valued at \$891,000. The valuation of all the public utility properties of the State aggregates \$1,096,134,250, according to the commission. Of this \$122,218,880 is real estate and \$973,915,370 personal property.

General Electric Exhibit for San Francisco

It is announced that the exhibit of the General Electric Company in the Transportation Building at the Panama-Pacific International Exposition will include electric locomotives, railway motors and control, signal accessory electric devices, electric apparatus and equipment for railway shops, electric illuminants, etc.

Among the electric locomotives will be the type built for the Butte, Anaconda & Pacific Railway. A 60-ton electric locomotive of the type built for interurban freight and passenger service for both 600-volt and 1200-volt d.c. operation will also be on exhibit. Further, there will be shown a 16-ton electric locomotive for industrial freight and switching service and two types of mining locomotives.

The display of the commutating-pole ventilated-type motors will embrace 600, 1200 and 2400-volt types. Type MK control equipments will be shown on exhibition racks placed end to end with control jumpers and air-brake hose connections for train operation. Each control equipment consists of a master controller, contactor box, etc., completely wired up for operation of two GE-247 motors mounted on a truck beneath the rack. These equipments also include completely installed straight and automatic air brakes.

Another rack will carry a complete Type M multiple unit control designed for three-speed operation in city service. The controller exhibit will include the K-35, K-36, K-51 and K-201 types, fuse boxes, rheostats, switches, lightning arrestors, gearing, gear cases, etc. Railway lamps will demonstrate effectively systems of lighting cars with Mazda lamps; also both incandescent and luminous arc headlamps with semaphore lenses and parabolic reflectors.

The signal accessories will include transformers, vacuum and multi-gap lightning arrestors, motor-generator set, switchboard, instruments, etc. The new apparatus will include a multi-recorder for attachment to switchboards to keep automatically a record of the time of the manipulation of the various switches.

Headlight Test at Mobile

An unusually thorough headlight test has been recently recorded by the Esterline Company, Indianapolis. This resulted in an order for the complete re-equipment of the Mobile Light & Railroad Company's cars, at Mobile, Ala., with "Golden Glow" equipment, the detailed investigation having been made under the supervision of P. P. Crafts, general manager, and S. M. Coffin, master mechanic of that company, with F. O. Grayson, representing the Esterline Company.

The tests were made on two different occasions when conditions were as severe as possible, the nights being very dark. A special car was equipped with a standard 5-amp arc headlight, a "Golden Glow" interurban headlight, and a "Golden Glow" city-type headlight for use with 23-watt and 46-watt bulbs. On the first night the trial was made on an isolated piece of track. A man, about 5 ft. 6 in. tall, dressed completely in black, was started up the track. He was lost to sight with the arc light at 280 ft., with the "Golden Glow" interurban headlight at about 500 ft., with a 46-watt bulb at approximately 300 ft., and with a 23-watt bulb at about 250 ft.

It was decided after this test that the interurban-type "Golden Glow" lamp would give too great an illumination for city service, and, therefore, that a decision had to be made between the 23-watt and 46-watt bulbs in the "Golden Glow" type SM-95 headlight. Accordingly, on the next night, another car equipped with the same arc light and the "Golden Glow" SM-95 headlight was tested on a different line. The car was stopped at

the end of the line, throwing a light on the public highway immediately ahead. Again the test of picking up a man dressed in black was made, and it was found that he could readily be seen for distances from 250 ft. to 300 ft. with a 23-watt bulb, whereas with the arc headlight he could be seen only at a distance between 150 ft. and 200 ft. The investigating party then walked ahead of the car and found that they could readily read the second hand on a watch at a distance of 700 ft. from the car, indicating that even at this distance the light would be noticeable to a person on the track.

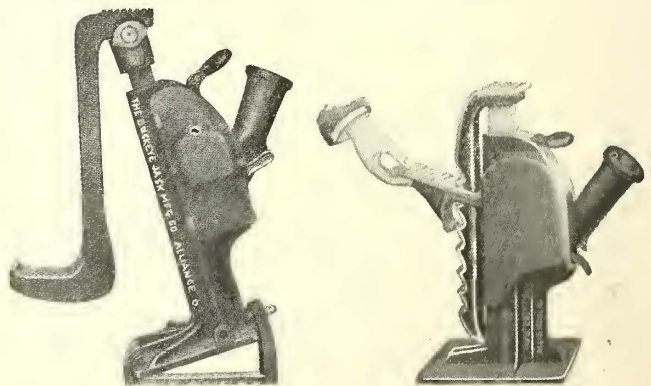
A still more thorough test was then made by sending two men ahead on a preceding car. These men were let off at a point unknown to the test party and instructions were given to the motorman to apply the brakes on the special car when opposite these men. This was done to determine how many feet it would take at a certain rate of speed to bring a car to a full stop after reaching the men at the side of the track. This test was made at a speed of approximately 30 m.p.h. The motorman applied his brakes in the usual manner when coming opposite the men and had his car under control after running approximately 100 ft., making a full stop in 200 ft. This test was then repeated except that an emergency stop was made, the car being brought to rest within 150 ft.

Two additional stops were made by letting men off of the preceding car at an unknown point and having the test car stop as soon as they came within the vision of the motorman. In each case the car was stopped a considerable distance before reaching the men.

Emergency Jacks

The Buckeye Jack Manufacturing Company, Alliance, Ohio, has recently brought out several types of emergency jacks, of which the No. 14 special and the No. 239 are illustrated.

The salient feature of the No. 14 special is an adjustable auxiliary foot which allows almost instantaneous adjustment to practically any height. Furthermore, this adjustment requires no tool, so that the jack is most properly entitled to the name of "emergency." The No. 239 jack is distinguished by the use of a swivel top which permits the user to operate the jack in any



JACKS WITH AUXILIARY HEEL AND FOOT RESPECTIVELY

position, either side or front. In addition, the jack may be used either with or without the auxiliary heel, whereby the operator can use the jack at an angle without the usual blocking up. The No. 239 special is like the No. 239 except that a quick adjustment for height is provided within the original lifting limits. The company also makes, among other types, the No. 21, a double-acting trip jack for trackwork, and the No. 50, a 5-ton jack for shop work. The forgings in all of these jacks are specially heat-treated, the steel and malleable castings being of grades suitable for severe service.

Messages of the Governors

Additional Extracts to the Various State Legislatures of Interest to Electric Railways

Extracts from the messages of the Governors of Connecticut, Montana, Oregon, Washington, Pennsylvania, Ohio, South Dakota, Iowa and South Carolina follow, supplementing those published last week:

GOVERNOR S. V. STEWART OF MONTANA

"There is little need for drastic or radical legislation. No great revolutionary principles are involved in the matters that I shall suggest, or in the subjects that will otherwise come before you for consideration. If you can devise some means of organizing an emergency State police, for use in rare instances where the necessity may arise, contingencies may be met and without any expense to the public. If it had been possible to send fifty experienced, determined officers into Butte under the leadership of some good man instead of spending \$125,000 in quelling the disturbance with the militia after it had assumed vast proportions, the whole matter would have been adjusted effectively for a nominal sum.

"It would seem to me that it is incumbent upon this Legislature to enact a reasonable, fair and proper compensation act."

GOVERNOR JAMES WITHYCOMBLE OF OREGON

"The State Tax Commission may well be abolished, and the work of the present body transferred to the office of the Railroad Commission, which should be given authority to employ an expert in taxation and assessment to conduct this branch of the office. It is my opinion that the scope of work handled by the Railroad Commission makes its title inadvisable and I recommend the substitution of the name 'Commission of Public Utilities.'

"I favor the creation of hydroelectric power districts somewhat along the line of existing irrigation district procedure, whereby groups of individuals in a community may band together for the co-operative development of the water-power resources of their neighborhood."

GOVERNOR ERNEST LISTER OF WASHINGTON

"It is probable that there will be introduced for your consideration some bills providing for a curtailment of the powers of the public service commission in relation to the regulation of public utilities within the boundaries of municipalities. Personally I feel that the tendency ought to be to increase rather than to decrease the power of the State commission and that the State commission ought to be given regulative power over municipally-owned utilities."

GOVERNOR MARTIN G. BRUMBAUGH OF PENNSYLVANIA

"We must enact a fair and certain workmen's compensation act. The present liability act needs amendment to the end that it may be in full accord with the above proposed act, and that both alike may guarantee to our workers the certain and speedy relief they merit and should have."

GOVERNOR RICHARD I. MANNING OF SOUTH CAROLINA

"I recommend the appointment of a commission to study the question of a workmen's compensation act and to report, by bill or otherwise, to the Legislature to convene in 1916, a measure that will bring relief to plaintiffs and defendants."

GOVERNOR MARCUS H. HOLCOMB OF CONNECTICUT

"The New York, New Haven & Hartford Railroad has in the past provided efficient and economical service to our people and industries, and has, until within a recent period, annually contributed in taxes a very substantial part of the revenues required to defray the expenses of our State government. By reason of existing conditions in its affairs, in part at least created by actions brought against it by our federal government, the financial strength of this corporation has materially lessened, resulting in a yearly loss to the State of some \$600,000 in taxes and a prospec-

tive enforced decrease in efficiency and increase in expense of service. It is apparent that its managers are making commendable efforts to solve the difficult problems which confront them, including those which with increasing seriousness confront all public service transportation companies throughout the United States."

GOVERNOR FRANK B. WILLIS OF OHIO

"The present workmen's compensation law was placed on the statute book by unselfish, non-partisan effort; it is hoped that no amendment will be made to the law which will in any way decrease the benefits now enjoyed by working men under its provisions, and that so soon as the state of the insurance fund will admit of it the amount to be paid to injured working men or their families in case of death or total disability shall be increased."

GOVERNOR FRANK M. BYRNE OF SOUTH DAKOTA

"Laws should be passed giving the Railroad Commission control of light and power companies in the State, and generally extending their authority in the direction of a general public utilities board."

GOVERNOR GEORGE W. CLARKE OF IOWA

"Under our present methods everybody knows there is no such thing, and cannot be, as an intelligent selection of at least half of our public officials. But I will not rediscuss the question. It ought to have your most earnest and careful attention. I might, however, suggest that certainly the office of railroad commissioner ought to be made appointive. Neither will I rediscuss the question of public utilities. I discussed that question two years ago and I now reiterate all I then said."

Pay-As-You-Enter Patent Decisions

The United States Circuit Court of Appeals for the Second Circuit, sitting in New York, handed down last week two decisions relating to the original pay-as-you-enter patent. The first of these cases was that of the Prepayment Car Sales Company against the Orange County Traction Company, appealed by the defendant, and the patent in the suit was that issued to Ross and McDonald in 1905 for improvements in passenger cars.

The opinion in the Circuit Court of Appeals was rendered by Judges Coxe, Ward and Rogers. The court refers to the previous trial of the case in the lower court, where the patent was upheld, and to the various clauses in the patent and particularly to a patent issued to Moore in 1888, which, the court said, described a structure similar to that shown in the patent in suit. In conclusion, the court said that if there was no exercise of the inventive faculties in locating the conductor upon the rear platform of cars shown in the prior art for the purpose of collecting the fares of passengers at that point, the lower court erred in submitting the case to the jury and should have directed a verdict for the defendant. The judgment of the lower court in upholding the patent was therefore reversed.

At the same time the court handed down a decision in the case of the Pay-As-You-Enter-Car Corporation against Douglas Robinson, as receiver of the Metropolitan Street Railway Company, involving the same patent, and in this decision said in part, "In view of what we have said in the Orange County case, we think a broad construction of these claims is out of the question."

Mr. Casey, president of the Prepayment Car Sales Company, in answer to a request for a statement on the situation, said that he would have to await the formal rendering of judgments in the cases, in order to see their wording, before the company would decide upon its definite future action. He further stated that the company does not consider this decision by the Court of Appeals, which in any event refers to one only of their various patents, as final, and that it will, if necessary, carry the case to the United States Supreme Court.

News of Electric Railways

NEW YORK COMMISSION REPORTS

Summaries of the Work of Both Commissions Presented to the Legislature

The Public Service Commission of the Second District of New York presented its report to the Legislature on Jan. 15. Two hundred and ninety-eight entire days of the calendar year were devoted to hearings, 630 in number, in Albany, Buffalo, New York and elsewhere in the State. Formal and informal cases numbering 2195 were settled between March 16, 1914, the date the present personnel of the commission was organized, and the first of the year. During the latter period 1756 new cases were filed with the commission—slightly more than the usual number for a like period in other years. On March 16 there were 390 formal and 558 informal cases pending. On Jan. 1 there were but 182 formal cases and 327 informal cases, all in active process of settlement.

Important changes in the public service commissions law are recommended to the Legislature. These include the extension of the authority to suspend proposed rates, pending determination of their reasonableness, to the rates of telephone, telegraph, gas, electric and all corporations subject to rate regulation, in the manner provided last year in the case of common carriers in conformity with the interstate commerce law. Amendments are also asked to the "long and short haul clause" and for a provision compelling carriers to furnish shippers with written statements of rates on demand, in conformity with the interstate commerce law.

A year's experience with auto-bus lines has convinced the commission that the law making them common carriers and subject to the regulation of the commission should be repealed. "There seems to be no sound reason why any person or corporation should not use the highways under proper regulations drawn by the highways department," the commission says, and adds that these applications take the time of the commission from more important matters.

In the matter of grade crossing elimination in general the commission shows that while no work under way has been held up, and while many new eliminations have been authorized during the year, the fact that no appropriation for this purpose has been made in three years has resulted in a condition where the State finds itself confronted with grade crossing cases in which the State's share of the expense is \$1,000,000 and which are ready to be proceeded with as soon as an appropriation is available. Grade crossing accidents are the only class of railway casualties which show an increase during the last year.

The commission for the first district reported to the Legislature the continuation of its work under the dual-system agreements in letting new construction contracts and in supervising the work under those already awarded. From Jan. 1 to Dec. 31, 1914, it awarded twenty-four construction contracts besides several contracts for track materials, installation of tracks, and station finish, aggregating in contract prices about \$52,000,000. This is more than double the amount awarded in 1913.

The running expenses of the commission during the year amounted to practically \$3,000,000. Of this amount \$2,500,000 was chargeable to rapid transit, and under the dual system contracts these expenses of the commission are included in the cost of construction of the rapid transit lines; that is to say, they become a part of the city capitalization upon which the companies make interest and sinking fund payments. The increase in expenses of the commission on its rapid-transit work is due to the large increase in the amount of its engineering work. The remaining expenses of the commission, about \$500,000, are incurred in connection with the duties of the commission under the public service commissions law and the railroad law, on regulation work.

Transit relief, the report says, will be provided in a measure during the year 1915 by the temporary operation of the Steinway tunnel and the Fourth Avenue subway, in Brooklyn, both of which are expected to be opened in the spring. The next relief, it is stated, will come from the

beginning of operation of the new elevated railroads, third-tracking, and extensions.

For the year 1914 the total number of accidents on transportation lines was 71,510, a decrease of 121 from the year 1913. This figure includes 292 deaths and more than 2000 cases of serious injury of a permanent character.

For the fiscal year ended June 30, 1914, the total number of passengers carried by all street railroads in the First District, that is, elevated, subway, and surface lines, was 1,813,204,692, an increase of 43,328,184 over the previous year. The total receipts of such companies for the year were \$94,153,673.93, an increase of \$2,012,068.89. Estimating the population of the greater city at 5,400,000, this is \$17.43 per capita for street-car fares.

REPORT OF MASSACHUSETTS COMMISSION

Summary of Second Annual Report, for Year Ended June 30, 1914

The second annual report of the Massachusetts Public Service Commission was submitted to the Legislature on Jan. 20, covering the year ending June 30, 1914. Brief mention is made of the careful enunciation of principles in the Middlesex & Boston rate case. A special report will be submitted later upon the transportation needs of the Boston district.

Returns were received from fifty-three electric railways. The total main track operated is 2927.7 miles, a gain of 9.15 miles over 1913. The gross assets are \$217,960,086; the gross liabilities, \$206,974,502; the surplus, \$10,985,578, or a surplus representing 11.19 per cent of the capitalization, compared with 11.18 per cent last year. There was a gain in surplus of \$112,609 in the year. The aggregate capital stock is \$98,194,775, an increase of \$910,400, and the total amount of dividends declared was \$5,109,368, or 5.2 per cent of the capital stock, compared with 5.17 per cent last year. The net divisible income exceeded dividends declared by nearly \$100,000. The net debt is \$100,590,688, compared with \$97,069,948 in 1913. The total cost per mile of main track is \$70,646, compared with \$68,881 last year, and the capital investment per mile is \$70,179, against \$68,623 in 1913. Of the present investment per mile, \$37,882 represents construction cost, \$13,112 equipment, and \$19,652 other permanent property, chiefly lands, buildings, parks and power plants.

The total operating revenue for the year was \$39,703,706, and the total income \$41,625,904, the latter representing an increase of \$1,611,870 over 1913. The total expenditures were \$41,526,865, an increase of \$1,382,394 over last year. Operating expenses, \$26,665,220, gained \$938,166; taxes, \$2,461,321, decreased by \$39,118, and dividends increased \$77,641. The surplus for the year, \$99,039, was \$229,476 ahead of 1913, when there was a deficit of \$130,437. The revenue from passengers was \$37,942,313, an increase of \$1,382,770, and the revenue from the carriage of mails and merchandise, \$811,090, gained \$252,371 in the year. The net operating revenue, \$13,038,486, was \$641,847 above last year. The estimated number of passengers carried, computed on the basis of 5-cent or 6-cent fares collected, was 766,628,535, or 261,853 per mile of main track operated, a gain of 8809 per mile during the year. The percentage of operating expenses to gross earnings was 67.16, against 67.48 last year. A brief summary of various unit figures follows:

	1913	1914
Gross earnings per mile of main track.....	\$13,461	\$14,017
Operating expenses per mile of main track.....	9,084	9,414
Net earnings per mile of main track.....	4,377	4,603
Gross earnings per car-mile, in cents.....	29.19	29.99
Operating expenses per car-mile, in cents.....	19.70	20.14
Net earnings per car-mile, in cents.....	9.49	9.85
Gross earnings per passenger, in cents.....	5.16	5.18
Operating expenses per passenger, in cents.....	3.48	3.48
Net earnings per passenger, in cents.....	1.68	1.70

During the year the companies ran 132,355,825 car-miles, compared with 130,588,851 car-miles in 1913; the number of cars owned is 8364, against 8154 last year; and there are 23,412 employees, compared with 24,136 in 1913.

A feature of the report new this year is a description of the work of its various bureaus. The commission points

out that a form is being perfected to enable electric railway tariffs to be filed satisfactory at the office of the board.

During the year 2471 electric car inspections were made and no serious defects were found, the number of cars found defective with reference to wheels, brakes, lighting, seat frames or untidiness investigated on electric railways was: Collisions, forty; broken axles, journals and wheels, 396; defective track, 326; miscellaneous 248. Jacks were used six times to extricate persons from beneath cars, the time required being from five minutes to ten minutes. The number of passengers killed was thirty-two, employees, nine, and other persons, seventy-six; a total of 117, against 133 last year. The number of passengers injured was 6229; employees, 638, and others, 1415, a total of 8282, compared with 8796 last year. A new and valuable exhibit in the report consists of a number of tables of data upon steam and electric railway signal installations in the State, with percentages of track equipped, types of signals in use, etc.

KANSAS CITY REORGANIZATION

Board of Control Work Essential Irrespective of Successful Completion of Reorganization

Judge William C. Hook of the Federal Court at Kansas City, Mo., delivered an opinion on Jan. 13 that the board of control provided as a feature of the management of the Kansas City Railways under the franchise granted six months ago, but not yet effective, should assist the receivers in the management of the property pending the readjustments required by the franchise. The franchise was to become effective only after a reorganization under certain terms, in which case the receivership should end and the property be turned over to the Kansas City Railways, the new company. Soon after the granting of the franchise the board of control named in it, specifically, as William P. Wood, representing the city and Philip J. Kealy representing the railway, was established by the receivers to assist in the running of the property, and especially to establish the work on the lines that it would operate in case the reorganization was effected and the Kansas City Railways got the property. There was said to be some conflict of authority between the board and the officers of the Metropolitan Street Railway and complaint had been made that the board was unnecessary.

Judge Hook ruled in the recent opinion that whatever the outcome of the receivership and the present court proceedings might be, it was highly necessary that the obligations of the previous franchises and ordinances be fulfilled, as to service, equipment and extensions; that these matters were specially designated in the new franchise as duties of the board of control, and that it would be very advantageous to the city and to the citizens, in case the reorganization was effected, to have the operation of the street railway already well established under the conditions of the franchise with the plans of the board of control well under way. If the reorganization were not effected the work of the board would have been necessary and valuable. The court made it plain, however, that the board is merely working under the receivers, to make recommendations to them, although such recommendations, in case of successful reorganization, must later be looked upon in the light of official action by the board. The work of the board, the court said, would be well worth the compensation to be paid from funds under the court's control. Explicitly, Judge Hook declared the province of the board of control to be: character and condition of cars, routing, schedules, transfers, and like matters of service; extension of old lines, improvements, and construction of new lines, meeting old obligations in arrears; specifications for equipment and improvements, construction, such as will outlast the receivership; determining whether specifications have been observed; decisions as to what part of disbursements are properly chargeable to capital account within the intention of the new franchise ordinance. The opinion closes with the following sentence: "The trouble in the past has been due to the confusion of an exceptional situation and not to intention."

WESTERN MASSACHUSETTS TRANSPORTATION

Report of Special Legislative Commission Suggests Electric Railway Construction by the State

The commission on transportation in western Massachusetts has submitted an exhaustive report to the Legislature suggesting the construction by the State of an electric railway through Hampshire County from Williamsburg to Hinsdale at a cost of about \$1,200,000, recommending the expenditure of about \$2,000,000 by the State for new highways, the extension of the authority of the Public Service Commission to permit the ordering of extensions of street railways into adjoining towns having no such service, and to permit the ordering of street railways to carry freight and express at the discretion of the board.

In the territory covered there are thirty-three towns without railway facilities. Regarding the developing of new trolley lines, the commission has been advised by President Howard Elliott that neither the New York, New Haven & Hartford Railroad nor the Berkshire Street Railway is in a position to undertake comprehensive additions to the facilities of the district. The report points out that the proposed interurban railway in Hampshire County might be operated by gasoline-electric motor car service, with a saving in first cost of about \$5,000 per mile over the usual trolley system. Mr. Elliott stated that should the State decide to build some of the local extensions of street railways referred to in previous legislation, he would be willing to recommend to the Berkshire and the New Haven companies that a traffic agreement be entered to operate such extensions under a yearly contract as agent for the State.

J. T. Harmer, president of the New England Investment & Security Company, Springfield, Mass., sent a communication in response to inquiries relative to the willingness of the Springfield Street Railway to build a line between Huntington and Cummington. The company could not favor this undertaking because of more pressing needs in the way of local extensions. Mr. Harmer stated that the projected line would probably not earn operating expenses and fixed charges for some time and pointed out that the possibility of the assumption by public ownership of existing lines is a deterrent to capital. He outlined the terms under which the company would operate the line as the agent of the State if financed by the latter. Among the conditions would be the furnishing by the State of rolling stock approved by the company, provision for arbitration of disputes, five years' operation by the company without charge for its services, with compensation thereafter for such administration, a minimum contract period of fifteen years, and the option of having the company supply the rolling stock subject to reimbursement for operating expenses, interest and depreciation. An alternative plan submitted by Mr. Harmer provides that the company shall operate the line at its own expense for fifteen years. In the latter case the State would assume the expense of maintenance and all taxes; fares to be maintained at not less than 5 cents with 2 cents per mile for any trip in excess of 2 miles, and half-fare provisions for school children; determination of schedule by the Public Service Commission based on the equivalent of two cars operating between terminals in the summer and one car in winter; authorization of the company to carry freight and express on the line, and provision for the purchase of the line by the company at the end of fifteen years.

The commission does not definitely recommend the construction of new electric railway lines by the commonwealth in view of the radical departure this involves from the established policy of the State, and it emphasizes the possibilities of development of the hill towns through highway construction and motor-truck service. It is of the opinion, however, that the Public Service Commission should have authority to require companies to extend their lines into adjoining towns having no street railway facilities, and appends the above extracts from correspondence and conferences with the railway companies, as evidence of the desire of the latter to co-operate to a reasonable degree in case the Legislature commits the State to build lines which at present cannot be financed by private capital.

BEMIS DETROIT APPRAISAL TOTALS

The Detroit street railway commission announced on Jan. 18 that Prof. E. W. Bemis, who has been in charge of an appraisal for the commission of the properties of the Detroit United Railway within the one-fare zone, places \$22,957,970 as the reproduction value of the properties. The average depreciation is fixed at 23 per cent by the appraiser, leaving a depreciated valuation of \$17,476,742, including \$1,062,910 worth of paving which Corporation Counsel Lawson declares belongs to the city although laid by the company.

The total of \$22,957,970 is exclusive of remaining franchises, bond discount and intangible values. In addition, no allowance is made for material on hand and the construction of lines completed since the beginning of the appraisal last summer. The company, in its inventory, set the reproduction value at about \$32,000,000.

The company's main track measured 198 miles, with 24 miles in sidings and yards. The total number of revenue cars is fixed at 1312. The summary of valuation as compiled by Professor Bemis and Edward P. Burch, engineer in charge, is as follows:

Way and structures, \$11,364,741, less 19 per cent for depreciation, \$9,216,083.

Equipment, \$5,730,319, less 25 per cent for depreciation, \$4,322,061.

Power, \$2,043,394, less 35 per cent for depreciation, \$1,325,688.

General and miscellaneous, \$2,048,000, less 25 per cent for depreciation, \$1,550,000.

Paving, \$1,771,516, less 40 per cent for depreciation, \$1,062,910.

The commission expects to receive Professor Bemis' figures on franchise and intangible values within a week's time.

TORONTO MAYOR ON TRANSPORTATION

Mayor Church, of Toronto, Ont., in his address to the Council on Jan. 11 said he was not content with having helped to defeat the purchase deal, but proposed to lay before the Board of Control a program for a proper transit system, radial entrances, and conservation and extension of the civic car lines. He urged the Council to apply to the Legislature to empower the city to spend \$50,000 on motor buses without the consent of the people, so as to try out this form of transportation with a view to giving relief and acting as an auxiliary to the existing system. He announced himself as opposed to the formation of a transportation commission and said he considered the Commissioner of Works to be administering the civic car lines efficiently and economically. He was opposed to any increase in the fares on the civic lines. He believed that the solution of the rapid transit problem was to be found along the lines of the Harbor Commissioners' plans. The purchase agreement and negotiations were now of the past, but the problem of adequate street railway service remained to be solved. The Harbor Board should be requested to prepare detailed plans, specifications and estimates of cost and the Council should request the Harbor Board, with the assistance of two representatives to be named by the Ontario Hydro-Electric Power Commission and representatives of the Council, to form a committee to prepare and present a full report as to what, if any, permissive legislation was required at the coming session of the Legislature. If the committee submitted its report by September or October the decision as to "fast traction" could be put before the people on Jan. 1, 1916.

NEW DES MOINES FRANCHISE DRAFT

Efforts of the Des Moines (Ia.) City Railway to secure a franchise were ended when the district court issued an order restraining the city from holding the proposed franchise election on Jan. 16, as advertised. Judge Utterback issued the restraining order. Judge Ayres, of the same court, refused an injunction asked by the city railway to prevent the city from submitting proposed amendments to the franchise in connection with the franchise election. He held that the election would be invalid in any case because Mayor Hanna had proceeded to advertise the amend-

ments along the franchise in the notices of the election. He ruled that under the Iowa law the election should be held on the original franchise as petitioned for by more than 11,000 voters of the city. His ruling was, in effect, a victory for the company, but the proceedings came too late to save the validity of the election. His decision was a basis for the later ruling of Judge Utterback in refusing to allow the election to be held.

The City Council now is drafting a new franchise ordinance which is to be submitted to Emil G. Schmidt, president of the company, in the hope that the city and company may be able to agree upon a compromise franchise to be submitted to the people. The chief issue at stake is that of capitalization. The general sentiment in the city is that the franchise would have carried if Mayor Hanna had not confused the issue and invalidated the election by his procedure in attempting to offer his amendments in connection with the franchise upon which the people had petitioned for a vote.

SEATTLE MAYOR'S VETO

Mayor Hiram C. Gill of Seattle, Wash., on Jan. 18 sent to the City Council his veto of the bill to submit to the voters on March 2 the question of issuing \$80,000 of 5 per cent bonds for the extension of Division "A" of the Seattle Municipal Railway into Ballard. He said in part:

"The \$80,000 of bonds for the construction of a street railway into Ballard and for a temporary bridge over the Lake Washington Canal would not cover half the cost of the work, but would simply open the way to get the work started. Because of the opportunity which the plan offers for the diversion of funds, I cannot see my way clear to take any other course than to veto the matter. Moreover, automobiles are about to supersede car lines. If the city, in the face of this fact, begins to spend money on further extensions, we are fools rushing in where angels fear to tread."

The opinion is entertained in the Council that the bill will receive the required number of votes to pass it over the Mayor's veto.

The Council has voted to submit at the March municipal election the bill to establish a municipal motor-bus service between the south terminus of Division "A" and the Highland Park & Lake Burien Line.

CLEVELAND TAX DISPUTE

After tendering payment of \$230,875 to the treasurer of Cuyahoga County, Ohio, as its taxes for 1914, the Cleveland Railway filed suit in Common Pleas Court for a temporary injunction to prevent the collection of \$318,624, the amount fixed by the State Tax Commission. The commission valued the property of the company for 1914 at \$22,412,500, almost \$500,000 more than for 1913, although suit is now pending concerning the 1913 figures. The company's estimate of the value of the property is \$16,504,701. It is on this amount that taxes were tendered. A willingness was expressed some time ago to pay on a valuation of about \$19,000,000 as a compromise, but the commission would not accept the amount and insisted that its valuation is correct. Under the circumstances, it would seem that the Public Utilities Commission will have to accept the Tax Commission's valuation when any question as to fares comes up, or, on the other hand, the Tax Commission will be compelled to accept the valuation placed upon the property by the Public Utilities Commission, if it makes it less than the present tax figures.

Air Brakes in Waco.—The Southern Traction Company, Dallas, Tex., has announced that it intends to equip all of its double truck cars in use in Waco with air brakes.

Rapid Transit Ordinance Accepted.—The ordinance giving the Cleveland Rapid Transit Railway the right to build subways under certain streets and signed by Mayor Baker, has been accepted by the company.

War Losses of German Company.—The Allgemeine Company, Berlin, Germany, has been a heavy sufferer on account of the war. The official publication of the company says that up to Nov. 30 seventy-four workmen and thirty-eight officers had been killed in battle.

The Crosser Bill.—The Crosser bill for the municipal ownership of the street railways in the District of Columbia was not brought up for consideration in the House on Jan. 11. This, it is said, reduces to a minimum the chances of debate on the measure this session.

Briefs Concerning State Accounting Asked by I. C. C.—The Interstate Commerce Commission will receive briefs until Feb. 27 and hold a hearing in Washington on March 4, relative to the subdivision of primary accounts (subject to certain restrictions), in order to comply with local state requirements.

New Haven Charter Change.—The New York, New Haven & Hartford Railroad has petitioned the Legislature for a change in its charter, which would empower it to sell, pledge, or dispose of, in any way, any shares of capital stock which it may hold in any other steam railroad or street railway corporation.

Offer to Sell to City.—The City Council of Alexandria, La., is expected to act this month on a proposition which has been made by the Southern Traction & Power Company, operating the Alexandria Electric Street Railway, for the sale of the property to the city. The company operates 7 miles of line in Alexandria. The question of municipal ownership will have to go before the voters.

Toledo Municipal Ownership Question.—The evening of Jan. 20 was the date for the City Council to sit as a committee of the whole to discuss City Solicitor Thurstin's ordinance authorizing the issue of \$4,000,000 bonds for the purchase of street railway lines. Mr. Thurstin was assailed recently by some of the labor organizations because he did not ask for a bond issue of sufficient size to purchase the entire property of the Toledo Railways & Light Company.

Toronto Appraisal Costs.—The report on and valuation of the property of the Toronto (Ont.) Railway and the Toronto Electric Light Company carried out by John MacKay & Company will cost the city \$42,000, according to the bill sent to the city. This valuation was ordered by Mayor Hocken during the negotiations for purchase of the assets of the two corporations. The receipt of the bill of MacKay & Company increases the total cost in connection with the purchase deal to \$67,123.

Examination Asked in Cincinnati.—Walter Schoenle, city solicitor of Cincinnati, Ohio, addressed a communication to the City Council on Jan. 16, in which he asked permission to examine the books and records of the Cincinnati Traction Company and the Cincinnati Street Railway. The State Public Utilities Commission, he said, will soon submit its report on the physical valuation of the property, but he contends that this information is only part of the material to be considered in determining the cost of carrying passengers.

Daily Paper Analyzes Public Utility Bond Issue.—The Boston *Commercial*, in its issue of Jan. 16, published a detailed analysis of the first consolidated mortgage 5 per cent gold bonds of the Bangor Railway & Electric Company, Bangor, Maine. This analysis, which fills two columns, takes up the question from the points of view of geographical location, franchises, property, capitalization and earnings. It is concluded that the issue is a good investment, offering a high degree of safety, a fair yield and easy marketability.

Short Municipal Lines Opened.—The new \$35,000 municipally-owned street car lines in Tacoma, Wash., were placed in operation on Jan. 10 by the Tacoma Railway & Power Company. One line runs out Eleventh Street to the shops of the Chicago, Milwaukee & St. Paul Railway on the tide flats. The other runs over St. Paul Avenue to the tide flats. The Tacoma Railway & Power Company is to operate the lines in connection with its other lines for seven years and furnish the equipment under a partnership arrangement with the city.

Ohio Labor Legislation.—George R. Davies, president of the Cleveland branch of the Amalgamated Association of Street & Electric Railway Employees, said on Jan. 19 that it would not be possible to give out any detailed information regarding the legislation that will be asked of the present General Assembly until the results of the meeting

held in Columbus are put into shape and discussed for a second time by the committee. Mr. Davies said the men feel that there should be a minimum day of so many hours, perhaps eight, and that the law should be made clear regarding the number of hours of continuous rest. There are eighteen local organizations of the Amalgamated Association in Ohio.

Duplication of Utilities to Be Prevented.—The Public Service Commission of the State of Washington has decided to recommend to the Legislature a change in the public service commission laws by which public utilities desiring to compete with an established utility of the same character would first have to obtain from the commission a certificate of "public convenience and necessity." C. A. Reynolds, chairman of the commission, says that the object is to prevent unwarranted duplication of public utilities, the cost of which the public ultimately has to pay. It is thought that this amendment would make it possible for the commission to deal promptly and effectively with "jitney" bus lines operated in competition with well established street railway lines.

Municipal Motor Bus Fund in Seattle.—Mr. Hesketh recently introduced a resolution in the City Council of Seattle authorizing the transfer of \$50,000 of bonds from the Municipal Street Railway issue to a fund to operate motor buses to connect Division "A" with Division "C," the Highland Park & Lake Burien branch of the municipal railway, and submitting the proposition to the voters at the general election on March 2. The resolution proposes that motor buses meet all Division "A" cars at Third Avenue and Pine Street and carry passengers through the center of the city on transfer privileges to the south city limits on the Lake Burien Line. This resolution has since been acted upon and approved by the Council as noted on page 198 of this issue.

Report on London and Paris Facilities.—The New York (N. Y.) Railways has printed a pamphlet of 126 pages covering a report on the transportation facilities of London and Paris as of October, 1913. This report was prepared by George Keegan and F. T. Wood, who are assistants to Frank Hedley, vice-president and general manager of the Interborough Rapid Transit and New York Railways Companies, respectively. These gentlemen visited London and Paris in 1913 to see wherein any of the transportation practices in those cities could be adapted for New York conditions. Particular attention was given to the question of accidents, franchise agreements, taxation and motor buses. In view of the present applications of various interests to operate motor bus service in New York, these data, originally made as a private report, are of peculiar timeliness. Copies of this publication have been sent to the New York newspapers.

Arguments for Reopening of Passaic Gas Case.—Counsel for the cities of Passaic and Paterson on Jan. 14 began arguments for a reopening of the Passaic 90-cent gas rate case before the New Jersey Court of Errors and Appeals. The previous decision of this court, countenancing intangible franchise values in rate-making cases, was abstracted in the *ELECTRIC RAILWAY JOURNAL* of Dec. 19, page 1331. In opening the present arguments, municipal counsel attacked the qualification of E. J. Heppenheimer, lay judge, on the ground of his status as president and presumably as stockholder of the Colonial Life Insurance Company, which holds securities of the Public Service Corporation of New Jersey and its subsidiaries. The court unanimously decided, however, that the relation of the insurance company to the utility was that of creditor and did not give rise to the alleged disqualification. Decision was reserved by the court in regard to the reopening of the case.

New York Commission Investigation.—On Jan. 21 both Houses of the Legislature of New York passed the Public Service Commission inquiry resolution after amending it so the investigators would be specifically instructed to inquire into alleged duplication of work by the Public Service Commission and the Interstate Commerce Commission. The size of the committee was increased to five Senators and six Assemblymen. The Democrats did not oppose the passage of the resolution. Lieutenant-Governor Schoeneck announced

that the Senate members of the committee would be Senator George F. Thompson of Niagara County, George Cromwell of Richmond, Ogden L. Mills of New York, R. R. Lawson of Brooklyn, Republicans, and James A. Foley of New York. Speaker Sweet of the Assembly has selected Assemblyman McQuiston of Kings as one of the six he will name. Senator Thompson, chairman of the committee, announced on the day the resolution was passed that there would be a meeting for organization at once and that he expected the committee would get to work by Jan. 23.

San Francisco Company Questioned as to Policy.—The Board of Supervisors of San Francisco, Cal., has passed a resolution calling upon the United Railroads to answer seven questions as to policy regarding extensions and plans for improving service in specific cases, in order that the board "may be better able to prescribe certain actions on the part of that company (United Railroads) for service betterment." The seventh question reads: "If the United Railroads finds itself financially unable to meet with the call for improvement in the service in this community, why will it not adopt the policy of non-obstruction to the process of enlargement of municipal lines, it being the evident purpose of the citizenship, in finding that the United Railroads cannot cope with the situation, to provide their own service. By the above is meant that the policy of non-legal interference in the constructive policy in municipally-owned railroads should be recognized by the United Railroads as an effort on the part of this Board of Supervisors to relieve a very pressing problem."

Massachusetts Bills.—A bill directing the Public Service Commission to construct a new street railway line west of the Connecticut river, at an expense not exceeding \$1,500,000, and authorizing the commission to lease such line of railway to any railroad or any electric railway now operating in Massachusetts, was filed at the State House. The Boston Elevated Railway has petitioned the Legislature to amend the acts of 1913 relative to investments of savings banks. Bills have also been introduced into the House providing for the public ownership and operation of electric railroads throughout the State; that street railway car dispatchers shall not be required to work more than eight hours per day within ten consecutive hours; that all electric street cars shall be equipped with combined automatic and manually controlled fenders; that no car shall carry more passengers than 50 per cent. in excess of its seating capacity; that all tunnels and subways shall be equipped with emergency exits in the discretion of the fire commissioner, and that pupils of State normal schools shall be transported between school and home by street railways at half fare; that "jitney" bus lines shall be under the supervision of the Public Service Commission.

Bay State Arbitration Continued.—Hearings have been continued during the last week by the arbitration board in the investigation of the wages paid by the Bay State Street Railway, Boston, Mass. It was testified that the average hourly wage of all blue-uniformed employees for a typical week ended May 16, 1914, was 20.4 cents and the weekly total \$13.45. George T. Seibel, superintendent of the Taunton, Fall River and Newport divisions, described the efforts of the company to provide lobby furniture and shower baths and the abuse of these facilities by the employees. Fred Huff, chief instructor for the lines north of Boston, testified that he receives \$3 per day and explained the work of the company's instruction car which new men are required to visit on its first trip to their districts. Mr. Huff also testified that the work on a large part of the Bay State system was less arduous than that required in city service. Furthermore, the cost of living was less in outlying districts on account of lower rents and the possibility of truck garden farming by employees. James H. Murphy, superintendent of the Taunton division, said that conductors in his district are less burdened with tickets than in previous years. He submitted an off-hand list of about thirty trainmen living in homes equal in comforts to his own.

Chinese Engineers Return from Train Lighting Investigation.—Three Chinese engineers arrived in New York City on Jan. 17 on the *St. Louis* after an investigation of train lighting systems in England, authorized by the Chinese Ministry of Communications. The members of the party consisted of Chan Y. Hoey of the Pekin-Mukden

Railway, W. H. Hsen and C. Y. Fung. Owing to the European crisis the engineers were obliged to return to their native country by the circuitous Western route. They left for Chicago after remaining in New York for two days. They will sail from San Francisco on Jan. 30. In discussing Chinese conditions with a representative of the *ELECTRIC RAILWAY JOURNAL* Mr. Hoey stated that little new railway construction is contemplated in China owing to the lack of available capital and the present unsettled state of the Chinese government. Steam railroad electrification has not yet attracted much attention in China owing to the abundant coal supply now available. The only new street railway system contemplated, so far as Mr. Hoey knew, was in Pekin. The government a short while ago granted a franchise to a private company to build a street railway in this city. The company, however, neglected to carry out its end of the agreement so the government accordingly revoked the franchise and is now considering building a municipally-owned line.

Philadelphia Transit Mass Meeting.—A mass meeting was held in Philadelphia on Jan. 14 to further the plans for bettering rapid transit conditions in that city. A. Merritt Taylor, director of city transit, made an appeal for the support of the rapid transit plan of May 27, 1914, by which a co-operative program was arranged and tentatively agreed to by the Department of City Transit and by the officials of the Philadelphia Rapid Transit Company. The program provides among other things that when the city builds the initial high-speed lines at a primary cost of approximately \$46,000,000, the Philadelphia Rapid Transit Company shall equip them at a primary cost of about \$12,000,000 and operate them in conjunction with its present system. Mr. Taylor said that plans and specifications for the construction of the sections of the delivery loop would be ready for bidders in March, but that bids could not be invited or contracts let for this work until after a special election has been called by City Councils and the people have voted for an increase in the city's indebtedness to provide the necessary money. The method of working out the details of the mass meeting were probably unique in the annals of American urban transportation. The *Philadelphia Ledger* said that at the mass meeting the people wrote a new chapter in the city's annals by an ultimatum to the municipal legislators that a special election shall and must be called for March 1 in order that the loan for improved transit may be floated. Bands and red fire and even a rapid fire gun were used in connection with the meeting. Words covering the people's transit message were put to the airs of "It's a Long, Long Way to Tipperary," "You're a Long Way from Home" and "Marching Through Georgia."

PROGRAM OF ASSOCIATION MEETING

Chamber of Commerce of the United States

As previously announced in the *ELECTRIC RAILWAY JOURNAL* the annual meeting of the Chamber of Commerce of the United States will be held at the New Willard Hotel, Washington, on Feb. 3, 4 and 5. President Wilson will speak at the dinner on the evening of Feb. 4. The foreign trade situation will be dealt with at length by both the Secretary of State and the Secretary of Commerce. Secretary Redfield will deal with the general development of the foreign trade, and his presentation will be supported by Dr. Edward E. Pratt, chief of the bureau of foreign and domestic commerce, and other prominent speakers on different phases of the subject, such as Latin-American and Oriental commerce. Samuel McRoberts, vice-president of the National City Bank, New York, will lead the discussion on the relation of the federal reserve act to trade expansion. Following this will come a report of the foreign trade committee of the Chamber of Commerce of the United States in favor of permitting a greater degree of combination for the development of foreign trade. The question of an American merchant marine will be dealt with by Secretary of the Treasury McAdoo. He will voice the administration sentiments and another speaker will be heard on the other side. Supplementary to the discussion there will be a report of the committee on merchant marine of the Chamber of Commerce. Joseph E. Davies, commissioner of corporations, will explain the new federal trade commission act.

Financial and Corporate

SEATTLE MUNICIPAL RAILWAY LOSING

Report of City Superintendent of Public Utilities for First Six Months Shows Loss of Nearly \$6,000 Per Month

An abridged form of the report of the Seattle Municipal Street Railway for the six months ended Nov. 30, 1914, as compiled by A. L. Valentine, city superintendent of public utilities, follows:

Revenues:	
Division "A," June 1 to Nov. 30.....	\$10,763
Less book credit for car rental.....	2,845
Net	\$7,918
Division "C," from May 23 to Nov. 30.....	9,628
Total	\$17,546
Operating expenses:	
Division "A," from June 1 to Nov. 30.....	\$15,049
Division "C," from May 23 to Nov. 30.....	\$15,847
Less book charge rental of cars, Division "A".....	2,845
Net	\$13,002
Total operating expenses.....	\$28,051
Loss to Nov. 30.....	\$10,505
Add:	
Six months' bond interest on \$300,000 at 1½ per cent..	6,750
Interest on \$75,000 borrowed from garbage fund and \$9,000 from general fund at 4½ per cent.....	1,890
Six months' taxes on \$375,000 of investment, Division "A," basis 45 per cent valuation.....	3,750
Six months' depreciation at 4 per cent on \$375,000, Division "A".....	7,500
Six months' interest on \$27,500 at 4½ per cent borrowed from general fund for Division "C".....	612
Six months' taxes on \$150,000 of investment, Division "C," basis 45 per cent valuation.....	1,500
Six months' depreciation at 4 per cent on \$150,000, Division "C".....	3,000
Total loss six months, Divisions "A" and "C".....	\$35,507

There was only one month in which either Division "A" or Division "C" showed an excess of traffic receipts above the operating expenses. This was July, when Division "C" showed an excess of \$145. The receipts for passenger traffic for Division "A" fell from the high record of \$1,482 in July to \$1,118 for November, the low record, and for Division "C" from \$2,184 in July to \$1,058 for November. The operating expenses varied from \$2,197 in October, the lowest for Division "A," to \$2,804 in November, while the amounts for Division "C" ranged between \$1,997 in June to \$2,680 in November. The passenger receipts of either division are not at present sufficient to pay the wages of employees.

The approximate loss of \$6,000 per month shown by the foregoing statement is quite exclusive of any charges for accounting or superintendence. Such work was performed by the public utilities department without any charge being made against the railway. Furthermore, the services of the legal department have been furnished continuously to the municipal railway without charge, as have also the services of the comptroller's and treasurer's departments. The time spent by the employees of these departments would represent a large sum of money. Lastly, no fire, damage, personal injury or employees' injury insurance funds have been provided.

RAILWAY INVESTMENT IN MASSACHUSETTS

The Public Service Commission of Massachusetts has submitted a special report to the Legislature in regard to the amount invested in street and elevated railways within the commonwealth and the estimated cost of the acquisition of such lines by the State. The board finds a total investment of \$206,442,630, composed of capital stock, \$98,194,775; funded debt, \$86,575,700; floating debt, \$14,655,722; premiums on stock, \$8,995,200; premiums on bonds, \$961,191, with a deduction of \$2,939,958 for discount on bonds. If a physical valuation should be determined as the basis of acquisition, the valuation would cost about a minimum of \$230,000; whereas, if the capitalization basis were accepted, the necessity of a physical valuation might perhaps be eliminated.

Any estimate that would be useful in the consideration of the larger problem of State ownership could only be made

after some definite policy of valuation has been established by the State. From the earliest enactments in the State, the basis for the taking over of railroads has been fixed in the granting of their charters, and has invariably been the actual amount invested in the property with a return of 10 per cent net per annum from the time of the investment, with deductions for dividends paid. Among the companies provided for in this way were the Metropolitan Railway, the Cambridge Railway and the Boston & Chelsea Railway. This basis for the purchase power, however, has not been fixed as a definite policy of the State in relation to the taking of street railways, and it is considered unlikely that such a basis will be established. If it were accepted, however, the result would be an apparent actual investment of more than \$200,000,000, to which would be added a net return of 10 per cent per year from the time of the investment.

The Commission was also asked to state whether any part of the cost of taking over the street and elevated railway lines could properly be assessed upon real estate to be benefited by such acquisition. Assuming that the language of the resolution would be held to describe real estate situated upon or contiguous to existing street railway lines, the commission feels that such real estate would not be subject to any separate assessment for any part of the cost of taking the lines. The entire report of the commission will be published by the State printer with an appendix reviewing the attitude of the State on the subject of public ownership of transportation facilities, as shown by various charters and general laws.

Central Arkansas Railway & Light Corporation, Hot Springs, Ark.—It is announced that the Central Arkansas Railway & Light Corporation will retire for its sinking fund on tenders to the Columbia Trust Company as many of its first lien fifteen-year 5 per cent bonds as can be purchased for \$20,000.

Charleston (W. Va.) Interurban Railroad.—The Charleston Interurban Railroad has increased its capital stock, authorized and issued, from \$100,000 to \$1,500,000 in \$100 shares. This company leases the Kanawha Valley Traction Company under a ninety-nine year lease, which gives it the right to make extensions under the latter company's own bond issue. When the lease was taken over there were in operation 11 miles of track, with an outstanding bond issue of \$875,000; there are now in operation 24 miles of track, with \$1,225,000 of bonds outstanding.

Chicago & Milwaukee Electric Railroad, Highwood, Ill.—On Jan. 14 the attorneys for John W. Griffith, a bondholder of the Chicago & Milwaukee Electric Railroad, requested before Judge Landis the return of \$210,000 which has been held as security by the master in chancery for two years since a bid of \$4,000,000 was made by Mr. Griffith for the purchase of the railway. This bid superseded the reorganization committee's bid of \$3,250,000, which was later declared void. A resale was ordered, but this has not yet taken place on account of unsettled financial conditions. Judge Landis granted the petition with the understanding that a bond be substituted so that the matter might be kept intact.

Chicago (Ill.) Elevated Railways.—The National City Bank, New York, is offering for sale first mortgage thirty-year 5 per cent gold bonds, dated 1911, of the Northwestern Elevated Railroad, at a price to yield about 5.7 per cent. These bonds are part of an authorized issue of \$25,000,000, of which \$12,500,000 are outstanding. They are due on Sept. 1, 1941, but callable as a whole but not in part, except for sinking fund, at 102 and interest on any interest date upon thirty days' notice.

Cleburne (Tex.) Street Railway.—The District Court at Cleburne on Jan. 9 appointed C. Hack Warren as receiver of the Cleburne Street Railway and ordered him to sell the property of the company. The receiver was appointed on application of A. M. Morgan, president of the company, and others. According to the latest information, there is authorized and outstanding \$65,500 of capital stock. The length of road is 8 miles.

Columbus Railway, Power & Light Company, Columbus, Ohio.—The directors of the Columbus Railway, Power & Light Company have declared a regular quarterly dividend

of 1¼ per cent on the preferred stock, series B, and the common stock, both payable Feb. 8 to stockholders of record Jan. 27. The date of payment is changed from the usual time of Feb. 1 because the transfer books were closed on Dec. 26 to remain closed until the special meeting on Jan. 26 to act on the proposed purchase of the Columbus Light, Heat & Power Company.

General Gas & Electric Company, New York, N. Y.—The various committees representing bondholders and stockholders of the Atlantic Gas & Electric Company, New York, have approved a reorganization plan under which the controlled properties will be taken over by the General Gas & Electric Company, which controls the Northwestern Ohio Railway & Power Company and the Rutland Railway & Light Company. The Atlantic Gas & Electric Company controls the electric lighting properties in Easton, Stroudsburg, Bangor, Bath and Sayre, Pa.; Philipsburg, Boonton, Dover and Rockaway, N. J., and Binghamton, N. Y. It also controls gas properties in Easton, Philipsburg and Nazareth. After the change of control, the Atlantic Gas & Electric Company, which has been under receivership, will go out of existence. Holders of its "A" bonds will receive ten-year 5 per cent gold bonds of the General Gas & Electric Company, secured by the same collateral or its equivalent. The "B" bonds will be paid off. To provide for immediate construction requirements a 6 per cent five-year secured note issue of the General Gas & Electric Company has been created. The proceeds of this note issue will retire \$650,000 of the old General Gas & Electric Company 6 per cent notes and also provide part of the requirements for new construction in 1915. Unsecured creditors, preferred stockholders and common stockholders of the Atlantic Gas & Electric Company will be allowed to participate in the reorganization through common stock and a new issue of convertible preferred stock.

Glendale & Montrose Railway, Glendale, Cal.—The name of the Glendale & Eagle Rock Railway has been changed to Glendale & Montrose Railway by decree of the Superior Court for the County of Los Angeles. This company has received authority from the California Railroad Commission to execute a new mortgage on its properties to cover \$115,000 of bonds previously authorized by the commission. The former trust deed is amended by eliminating from the provided security the equity in certain real estate, and in lieu thereof placing in escrow \$35,000 of the bonds to be issued to F. J. Walters, president. The bonds in escrow shall draw no interest until it shall have been found by the commission that the railway has earned its operating expenses, taxes and interest on outstanding bonds for a period of three years, and that for one year it shall have earned, in addition, interest charges on the \$35,000 of bonds that are to be placed in escrow.

Interstate Railways, Camden, N. J.—John A. Rigg, president Interstate Railways, has addressed a circular to stockholders in connection with a reconsideration of the plan advanced on March 28, 1913, for making the preferred stock of the company a permanent investment. This company controls numerous electric railways, which are divided into four groups leased to and operated by the Reading Transit & Light Company, the Wilkes-Barre Railway, the Trenton & Mercer Traction Corporation, the Southern Pennsylvania Traction Company and the Wilmington & Philadelphia Traction Company (the two last named companies being operated under one management). Mr. Rigg states that five years have elapsed since the making of the leases and that the lessees have paid all their obligations promptly and expended about \$4,500,000 in betterments. The board of directors recommends that the preferred stockholders agree to exchange the present certificates for a new \$1,000,000 issue of preferred stock without the redemption instalment clause, thereby giving the issue the quality of permanency.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—The Kansas Public Utilities Commission has authorized the Kansas City, Kaw Valley & Western Railway to issue \$2,500,000 of first mortgage ten-year gold bonds, \$812,500 of second mortgage bonds and \$1,137,000 of capital stock. These securities are to provide for building and equipping the line for complete operation. Of the 40 miles projected 17 miles are now in operation.

Lincoln Railway & Light Company, Lincoln, Ill.—The Lincoln Railway & Light Company was sold on Jan. 14 at public auction by Master in Chancery Mangas to J. R. Patton, Chicago, for \$9,900. Mr. Patton is a director of the Patton-Gibson Railroad Construction Company. Previous items regarding the receivership and ordered foreclosure sale of the railway appeared in the *ELECTRIC RAILWAY JOURNAL* of June 13, Aug. 1 and Dec. 5, 1914.

Little Rock Railway & Electric Company, Little Rock, Ark.—The stockholders of the Little Rock Railway & Electric Company have voted to increase the company's capital stock from \$1,500,000 to \$2,000,000, in order to raise funds to pay for the Merchants' Lighting Company and the Arkansas Cold Storage Company, recently purchased, and to make improvements in service. The stockholders may subscribe at par in proportion to their present holdings.

Medway & Dedham Street Railway, Westwood, Mass.—E. H. Mather, Brookline, who since March, 1912, has been acting as receiver of the Dedham & Franklin Street Railway and the Medfield & Medway Street Railway, has filed his final accounting and received his discharge. The two companies were sold under foreclosure in September, 1913, to H. M. Verrill and R. H. Johnson, representing the bondholders. On June 9, 1914, the properties were transferred to a new corporation, organized under Massachusetts laws and known as the Medway & Dedham Street Railway. This new company is now operating the two lines as one system, from Dedham to Franklin, a distance of about 21 miles.

Mexico Tramways, Mexico City, Mexico.—In a recent advertisement U. de B. Daly, secretary Mexico Tramways, says: "The board regrets that owing to the continued unsatisfactory condition of affairs in Mexico they have no alternative but to defer payment of the half-yearly coupons due on Jan. 1 on the company's 6 per cent five-year mortgage bonds. The same action has been taken with regard to the payment of the half-yearly coupons on the 5 per cent first mortgage bonds of Mexico Electric Light Company, Ltd., which is controlled by the allied Mexican Light & Power Company."

Minneapolis & Northern Railway, Minneapolis, Minn.—F. H. Hunter, whose appointment as receiver of the Minneapolis & Northern Railway to succeed the Minnesota Loan & Trust Company was noted in the *ELECTRIC RAILWAY JOURNAL* of Jan. 2, has filed a petition with the District Court for the Fourth Judicial District of Minnesota, setting forth the fact that all rights granted by the Soo Railway terminated on Jan. 17, that the contract with this company could not be extended and that it would be impractical to operate the electric line without such a contract. Moreover, the electric railway is now being operated at a loss and the cars are in a bad state of repair. An order is asked, therefore, authorizing the receiver to discontinue operations and allowing his account and reasonable compensation for services as a first lien upon the corpus of the property in the possession of the court. A hearing has been set for Jan. 23 for creditors to argue against such an order.

Monterey & Pacific Grove Railway, Monterey, Cal.—The Monterey & Pacific Grove Railway has defaulted in the payment of interest due on Jan. 1 on its first mortgage 6 per cent bonds. Earnings during the last year have fallen far below the interest charge, on account of the severe competition of an automobile bus line.

Moose Jaw (Sask.) Electric Railway.—The directors of the Moose Jaw Electric Railway have announced that no semi-annual dividend can be declared on the company's \$596,700 of stock on account of the general depression throughout the West and the decrease in traffic. The notice to stockholders states, however, that the resumption of dividends is not far off, and that the company has the distinction of being almost the only one west of Winnipeg which is paying its way.

New York (N. Y.) Railways.—Benjamin Catchings, who has represented the accident and tort creditors of the New York City Railway and the Metropolitan Street Railway, predecessors of the New York Railways, for years past, recently appeared before the United States Circuit Court of Appeals and argued in support of a motion to vacate all orders made by Judge Lacombe in surface traction litigation since the abolition of the United States Circuit Court on Jan. 1, 1912. Mr. Catchings contended that no judge

had a right to place himself in exclusive control of any particular kind of litigation. Through Judge Coxe the court denied the motion on the ground of no jurisdiction. Mr. Catchings stated that he would appeal to the United States Supreme Court.

Northampton Traction Company, Easton, Pa.—F. C. Williams, Easton, Pa., has succeeded David King, Newark, N. J., on the board of directors of the Northampton Traction Company.

Pacific Gas & Electric Company, San Francisco, Cal.—Subject to the approval of the California Railroad Commission, the Pacific Gas & Electric Company has sold through Bond & Goodwin \$4,000,000 of one-year collateral trust 5 per cent notes. These notes, as mentioned in the ELECTRIC RAILWAY JOURNAL of Jan. 16 in connection with the application therefor, are to provide for refunding a like amount of notes maturing on March 25, the balance of an original \$7,000,000, of which \$2,521,000 were retired last December.

Salt Lake & Utah Railroad, Salt Lake City, Utah.—E. H. Rollins & Sons, Boston, are offering at 98 and interest the unsold portion of the initial block of \$500,000 of first mortgage thirty-year 6 per cent gold bonds of the Salt Lake & Utah Railroad. These bonds are dated April 1, 1914, and due on April 1, 1944, but are redeemable at 102 and interest on any interest date. They are issued in denominations of \$1,000, \$500 and \$100. This company has in operation about 50 miles of standard-gage electric railway extending from Salt Lake City to Provo City.

San Francisco (Cal.) Municipal Railways.—According to a statement just issued by the bookkeeping department of the Board of Public Works, the total expenditures of the San Francisco Municipal Railways for the month of November totaled \$68,652, divided as follows: way and structures, \$2,348; equipment, \$4,870; power, \$13,213; conducting transportation, \$34,995; traffic, \$26; general and miscellaneous, \$2,748, and undistributed stores, \$10,350. Of the total, \$9,553 represented undistributed accounts, the balance of \$59,099 being for demands audited. The deduction of this amount from the total month's receipts of \$111,225 left an excess of receipts of \$52,126, and after a further deduction of \$1,599 in compliance with the Boynton Compensation Act, the net receipts totaled \$50,527.

San Joaquin Light & Power Corporation, Bakersfield, Cal.—The California Railroad Commission on Jan. 7 issued a supplemental order authorizing the San Joaquin Light & Power Corporation to issue \$150,000 of its series B first and refunding mortgage forty-year 5 per cent bonds. These bonds are secured by deed of trust to The Trust Company of America. The time within which the company may issue these bonds is limited to June 30, 1915. The company has also been authorized by the commission to renew certain promissory notes totaling \$92,500.

Slate Belt Electric Railway, Pen Argyl, Pa.—J. A. Miller, Nazareth, Pa., has been elected a director of the Slate Belt Electric Railway, succeeding D. M. Leopold, also of Nazareth.

Tri-City Railway & Light Company, Davenport, Iowa.—The Tri-City Railway & Light Company, a subsidiary of the United Light & Railways Company, is asking, through the New York Trust Company, for tenders to Feb. 10 of \$150,000 of its collateral trust first lien 5 per cent bonds for the sinking fund, at a price not to exceed 105 and interest.

Washington Railway & Electric Company, Washington, D. C.—The Public Utilities Commission of the District of Columbia on Jan. 12 denied the application of the Washington Railway & Electric Company for authority to issue \$644,000 of bonds to finance improvements made between Jan. 1, 1909, and Nov. 30, 1914, and for contemplated future improvements. The action of the commission is based on a belief that it should not issue bonds to cover the cost of the improvements made prior to Nov. 30, 1914, because it is not in possession of information showing the relation which the value of the property bears to the company's outstanding shares of stock and bonds. This information cannot be supplied until the commission has finished its valuation of the company's property. The com-

mission, however, will consider application for a bond issue to cover future improvements.

York (Pa.) Railways.—A scrip dividend of 2½ per cent has been declared on the \$1,600,000 of 5 per cent cumulative preferred stock of the York Railways for the half year ended Nov. 30, 1914, and payable on Jan. 30 to holders of record on Jan. 20. The scrip will be dated Jan. 20, will mature on Jan. 30, 1918, and will bear interest at the rate of 5 per cent per annum, payable semi-annually. It will be redeemable at the company's option on any interest period before maturity on thirty days' notice, and will be registered.

DIVIDENDS DECLARED

Boston & Suburban Electric Companies, Newtonville, Mass., \$1, preferred.

Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1¼ per cent, preferred, series B; quarterly, 1¼ per cent, common.

Commonwealth Power, Railway & Light Company, Grand Rapids, Mich., quarterly, 1½ per cent, preferred; quarterly, 1 per cent, common.

Denver & Northwestern Railway, Denver, Col., quarterly, 1 per cent.

East St. Louis & Suburban Company, East St. Louis, Ill., quarterly, 1¼ per cent, preferred.

Electric Bond & Share Company, New York, N. Y., quarterly, 1½ per cent, preferred; quarterly, 2 per cent, common.

Montreal (Que.) Tramways, quarterly, 2½ per cent.

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

Rio de Janeiro Tramway, Light & Power Company, Rio de Janeiro, Brazil, quarterly, 1¼ per cent.

Sao Paulo Tramway, Light & Power Company, Ltd., Sao Paulo, Brazil, 2½ per cent.

York (Pa.) Railways, 2½ per cent, preferred, payable in scrip.

ELECTRIC RAILWAY MONTHLY EARNINGS

BATON ROUGE (LA.) ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov., '14	\$15,705	*\$9,445	\$6,260	\$2,054	\$4,206
1 " " '13	15,481	*9,379	6,102	2,099	4,003
12 " " '14	178,083	*114,296	63,787	25,971	38,716
12 " " '13	161,126	*100,491	60,635	24,409	36,226

BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov., '14	\$8,056	*\$8,721	\$665	\$1,140	†\$1,805
1 " " '13	7,671	*8,500	829	1,028	†1,857
12 " " '14	121,375	*101,495	19,880	13,075	6,805
12 " " '13	124,563	*98,361	26,202	13,041	13,161

CAPE BRETON ELECTRIC RAILWAY, SYDNEY, N. S.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov., '14	\$30,045	*\$17,847	\$12,198	\$6,601	\$5,597
1 " " '13	34,849	*18,080	16,769	5,998	10,771
12 " " '14	356,269	*209,974	146,295	77,252	69,043
12 " " '13	379,170	*208,445	170,726	72,228	98,498

DALLAS (TEX.) ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov., '14	\$180,303	*\$96,199	\$84,104	\$33,389	\$50,715
1 " " '13	198,259	*116,034	82,225	26,703	55,522
12 " " '14	2,226,381	*1,310,289	916,092	364,242	551,850
12 " " '13	2,163,823	*1,260,599	903,234	300,935	602,289

EASTERN TEXAS ELECTRIC COMPANY, BEAUMONT, TEX.

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov., '14	\$56,868	*\$31,412	\$25,455	\$8,606	\$16,849
1 " " '13	45,088	*29,942	15,146	4,910	10,236
12 " " '14	672,441	*403,390	269,051	96,240	172,811
12 " " '13	415,872	*254,890	160,983	25,122	135,861

EL PASO (TEX.) ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov., '14	\$91,713	*\$42,184	\$49,529	\$4,179	\$45,350
1 " " '13	80,761	*40,549	40,213	4,296	35,917
12 " " '14	1,041,126	*579,966	461,160	51,375	409,785
12 " " '13	880,388	*471,289	409,099	56,960	370,609

SAVANNAH (GA.) ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov., '14	\$69,870	\$43,201	\$26,669	\$23,089	\$3,580
1 " " '13	71,497	48,732	22,765	22,704	61
12 " " '14	845,466	557,273	288,193	274,880	13,313
12 " " '13	821,722	577,504	244,218	256,645	7,573

TAMPA (FLA.) ELECTRIC COMPANY

Period	Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m., Nov., '14	\$80,922	*\$41,927	\$38,995	\$4,422	\$34,573
1 " " '13	75,743	*43,030	32,713	4,779	27,934
12 " " '14	978,607	*527,137	451,470	55,123	396,347
12 " " '13	828,630	*451,475	377,156	55,482	321,674

*Includes taxes.

Traffic and Transportation

THE "JITNEY" BUS

Developments Are Recorded in Los Angeles, in Texas Cities, in San Francisco and in Portland

Councilman Roberts, chairman of the public utilities committee of the City Council of Los Angeles, Cal., which has before it the "jitney" bus problem, was to confer on Jan. 15 with President Whiffen of the Council and chairman of the finance committee on the question of establishing a traffic bureau, separate and apart from the police department, to handle the "jitney" bus business after regulatory measures have been adopted by the Council and gone into effect. Mr. Roberts reported on Jan. 14 that his committee and City Attorney Stephens had made considerable progress in the matter of planning for the adoption of bus regulatory measures and expressed the hope that the work would be completed in a few days.

In a statement dealing with the "jitney" bus which he made public on Jan. 10 Mayor Rose of Los Angeles declared that the menace of the bus called for vigorous action and that he saw no reason why Council should delay action. His summary of the needs of the case follows:

"Summing up the question, I find, first, the need of relieving the congested streets, the remedy for which is the re-routing of the 'jitneys' in the manner proposed; rigid examination of each applicant for license as to his qualifications and character; specific route stipulated over which licensee shall operate his bus; license fee paid in proportion to gross receipts, the same as other public carriers. For reckless driving, or for violation of traffic regulations in any wise, power for revocation of license should rest with the city. I have given my views about the halting points for loading and unloading of passengers. One other important item is the necessity for fixed responsibility in case of accidents; not less than \$10,000 indemnity bond for each auto bus operated should be demanded, for the full protection of the public. These indemnity bonds should be closely investigated by the authorities as to the reliability of the insurance company carrying the risk. Lastly, overloading should be rigidly prohibited."

The Los Angeles Railway has laid off practically 100 men in the Fifty-fourth Street shops and stopped the building of 250 cars that were being turned out there in expectation of the 1915 business. G. A. Henderson, assistant general manager of the company, in explanation said:

"Two months ago Vice-President Dunn stated that this would have to be done, if earnings lost through the 'jitney' bus competition could not be made up. We held the men at work till after the holidays in order to keep the resulting gloom from as many homes as possible during the Christmas festivities. There was the corresponding hope that the new licenses required for the new year would result in the removal from the streets of a large number of the nickel snipers, and for a few days this seemed possible, for there was a falling off in the number of buses operating. At present, however, the new licenses are being taken out in wholesale fashion, and within ten days there will be more buses on the streets than ever.

"Two years ago the Los Angeles Railway adopted the policy of building its own cars and buying the materials in Los Angeles. Since that time we have been able to give employment to a large number of men. The loss of revenue to the company is the only thing that stops the continued building of new cars. Under the régime of the present State Railroad Commission a street railway is like a savings bank, for no bonds can be sold unless earnings are shown, and the loss of earnings stops the flow of bond money for improvements. On Dec. 31 we were overrun with 'jitney' buses. On Jan. 2, when the licenses had run out, their number decreased so that on certain lines additional cars could have been run. To-day the buses are coming back, after an absence of nine days. We must trim our sails to meet the conditions that we face."

It is stated that an effort will be made to secure the enactment of a law by the Texas Legislature prohibiting the operation of competing lines of transportation upon streets occupied by electric railway lines. In Houston, Austin, El Paso, San Antonio and other cities the "jitney"

automobiles are doing a large business hauling passengers in direct competition with the street railways. The fare per passenger is 5 cents and most of the buses operate on the same streets as the railways and snipe passengers waiting for the street cars. The first bus in San Antonio was placed in operation on Jan. 8. It is being operated from Alamo Plaza to San Pedro Place. The manager of the company has announced that eighteen other machines have been ordered for use in that city. He is quoted as follows: "The new automobile service we have started has come to stay. Our company has plenty of capital, most of which has been subscribed by San Antonians." It is stated unofficially from Houston that the Houston Electric Company has asked for estimates on motor buses and tire equipment.

The United Railroads posted an observer on a downtown corner in San Francisco on Jan. 11 to count the passing "jitney" buses. In one hour and twenty minutes eighty of the 5-cent buses passed in one direction, carrying a total of 420 passengers. It is estimated at the headquarters of the San Francisco Jitney Bus Association that 200 cars are now engaged in this business in San Francisco, and that the number will be doubled in a short time. In addition to the street railways the Board of Supervisors and the State Railroad Commission are giving attention to the problems involved in the regulation of the new method of transportation. The Railroad Commission has heretofore ruled that the buses are not under its jurisdiction, but it now intimates that if it becomes established that the buses interfere with common carriers, then they must be regulated as common carriers. The Board of Supervisors is framing a proposed ordinance covering the regulation of "jitney" buses, on the recommendation of T. A. Cashin, superintendent of the San Francisco Municipal Railways.

The "jitney" bus has entered into competition with the Portland Railway, Light & Power Company, Portland, Ore., at a 5-cent fare. The service started by the Auto Bus Company is under the direction of Jonathan Conway, said to have been connected with the transportation departments of the electric railways in Brooklyn and Buffalo.

To meet the competition of the so-called "jitney" bus the Massachusetts Street Railway Association has filed a bill with the Legislature setting forth the conditions under which such business may be carried on and providing for responsibility in case of damages caused by such bus lines.

ST. LOUIS TRANSIT HEARING CONCLUDED

The hearing conducted by the Missouri Public Service Commission into the service furnished by the United Railways in St. Louis was concluded at the session at the Planters' Hotel in St. Louis on Jan. 15. Briefs must be filed with the commission by opposing counsel within ten days after the transcript of the testimony is prepared. It is expected that oral arguments will be offered about Feb. 15.

The United Railways began the presentation of its part of the case on Jan. 13. P. J. Kealy, of the board of control of the Metropolitan Street Railway, Kansas City, Mo., said that the standard of service for St. Louis recommended by Mr. Harrop, engineer of the commission, was the severest of its kind of which he had any knowledge. Mr. Kealy said that operating managers were generally opposed to trailers, but that general managers who had to look out for the finances generally favored them.

Richard McCulloch, vice-president and general manager of the United Railways, said that the company would have no money left for improvements and extensions if it was compelled to pay the mill tax. The revenues of the company for December, 1914, showed a decrease of more than \$100,000 over December, 1913. The decrease in the number of passengers carried in December, 1914, over December, 1913, was about 7 per cent, or 2 per cent less than the revenue decrease. The company paid the city \$774,080 in taxes in 1914. Had the company paid the mill tax the total of taxes would have been \$1,009,713, or 8.11 per cent of the gross earnings. In addition between \$200,000 and \$250,000 was expended annually for repaving and maintenance. This amount should be added to the taxes.

The daily newspapers of St. Louis recently contained references to the division of profits between the railways in Chicago and the city itself. In this connection Mr. McCulloch said that the United Railways would be very glad

to make such an arrangement if, by so doing, it could be relieved of all the taxes it now pays to St. Louis. Transfer privileges in St. Louis were unlimited and the records of the company showed that for several years the average fares had been but slightly in excess of 3 cents. In a supplementary statement addressed through the newspapers to the public he said:

"It has always been and still is the desire and intention of the United Railways to give the best service. This communication is not written in a spirit of criticism or ill temper, but it is intended to be a plain statement of facts to be placed before the people of St. Louis, who have a right to be made acquainted with the conditions and who, we hope, will judge them in a reasonable manner."

At the hearing at which the question of heating and ventilation was considered it was testified that of the 1400 cars of the company, 870 are heated by coal-burning water heaters and the others by stoves. Mr. Harrop stated that the present heating and ventilating systems are adequate. D. I. Cook, Chicago, declared that the existing heating arrangements are antiquated and that the ventilation system is only one-fourth up to the average standard. He said that in New York, Boston, Philadelphia and Chicago electric heaters, controlled by thermostats, are used on all cars. Mr. Harrop admitted that cars might be heated more rapidly by the electric system, but said that they heated the car seats more and the passengers' feet less than the coal heaters. The hearing was continued.

TRANSIT PUBLICITY IN BROOKLYN

The Brooklyn (N. Y.) Rapid Transit Company is carrying its case direct to its patrons. Pamphlets dealing with the problems before the company are being distributed through the medium of the boxes installed in the elevated cars and the cars of the surface system. Recent pamphlets, all of uniform size, 4 in. x 7 in., are introduced as follows: "Why We Need the Nickels," "A Few Facts About Taxes and Transportation," "Brooklyn Transportation Before Grand Jury," "Why Spend \$300,000,000?" "Diminishing Receipts and Increasing Service," "That P. S. C. Inquiry." The pamphlets dealing with the inquiry into the service of the company by the Public Service Commission are being issued in a series.

The first two pamphlets carry the sub-titles, "The Light of Evidence on Mr. Johnson's Report" and "Knowledge vs. Ignorance on Fulton Street Traffic." The campaign of publicity now under way is in effect a new service for the patrons of the company supplementing the daily papers. In this service it has been the effort of the company to present facts both timely and important, which patrons do not receive through their newspapers as adequately and as correctly as they should. Considering the pressure and time under which newspapers are produced and of the material demanding attention, the company says that the wonder is that the newspapers succeed as well as they do in their endeavor to chronicle occurrences.

The first of the series issued by the company dealing with the inquiry by the Public Service Commission into its affairs had to do with the examination of Joseph Johnson, the head of the transit bureau of the commission, whose recommendations for changes in the method of operation of the company were referred to in the *ELECTRIC RAILWAY JOURNAL* of Jan. 9, page 108. The company says that when the hearing began this was its first chance to defend itself, except for such opportunity as the newspapers had given it, and that it naturally sought to discover the qualifications which led the commission to make Mr. Johnson its transportation prosecutor, and which gave his recommendations such weight as to make them the basis of the tentative order accompanying the report. According to the company this proposed order was based upon conclusions which found no warrant in the accompanying report, and if adopted would seriously interfere with the physical ability of the company to give such service as it is now trying to give under difficult conditions in Brooklyn.

The circulation of each issue of the bulletin has been about 250,000 copies. That is to say, about one person in every eight in the population of Brooklyn takes one of the pamphlets placed by the company in the boxes in the cars.

The inquiry being conducted into the service of the ele-

vated lines of the Brooklyn Rapid Transit Company by the Public Service Commission will be discontinued pending a conference.

CHICAGO SERVICE BEFORE COMMISSION

Up to this time the Public Utilities Commission of Illinois has not taken part in controversial questions between the city of Chicago and its public utilities regarding service, but the filing of a number of complaints on Jan. 9 by the president of the Cook County Real Estate Board has put the matter before that body. According to the commission's rules of procedure, the complaints must lay over for ten days before a formal hearing can be called. On Jan. 12 representatives of the companies were invited to an informal hearing, and instructed to furnish the commission with information which would serve as a basis for a comprehensive investigation. It was agreed that the cases against the Chicago Surface Lines and the Chicago Elevated Railways shall be consolidated and heard on Jan. 25 and 27 respectively.

At the preliminary hearing before the commission the city was represented by the chairman of the local transportation committee and the commissioner of public service. While the city administration has hesitated to commit itself before the State Public Utilities Commission, lest it appear to surrender the principles of "home rule" for which it has contended, the department of public service has submitted to the commission records compiled by the traction bureau of the department during the last six months.

James E. Quan, chairman of the Public Utilities Commission, in an interview stated that since the commission had been called upon to render a decision in connection with the complaints filed regarding Chicago's transportation service, it proposes to make a thorough investigation of the difficulties. This is taken by some as evidence that the commission intends to continue to make use of its full powers under the public utility law and remove the control of Chicago's public utilities from local politics.

At a recent meeting of the Chicago City Council, the city budget was railroaded through. It contains among other things a \$3,000,000 appropriation for motor buses and a \$2,000,000 appropriation for subways. It is proposed to take this money from the Chicago traction fund, and complete authority to do this will be asked for in referendum at the primary election to be held in February.

"Skip-Stop" in Cleveland.—At a meeting on Jan. 14 the East Cleveland Chamber of Commerce approved the service of the Cleveland Railway to that suburb. The alternate stop system has been adopted there.

I. C. C. Decision.—The Interstate Commerce Commission on Jan. 16 refused the application of the citizens of Somerset, a suburb on the Washington & Rockville Railroad, to declare the proposed increases in rates unreasonable. The increase rates became effective on Jan. 20 at midnight.

Detroit's Accident Record.—Of the 310,000,000 passengers carried in 1914 on the Detroit (Mich.) United Railway's city and interurban system only two passengers lost their lives as the result of collisions. Not one of the deaths from boarding or alighting occurred on a car with folding doors and steps.

Discontinuance of Smoking to Be Recommended.—J. L. Harrop, chief engineer of the Public Service Commission of Missouri, has announced that, as a result of his investigation into service in St. Louis, he intends to recommend to the commission that it issue an order to prevent smoking at all times in the street cars in Missouri.

"Skip-Stop" in Milwaukee.—The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., has filed with the Railroad Commission a complete list of stops to be eliminated by it as part of the "skip-stop" schedule in that city. The company has asked the commission to conduct a hearing to obtain the views of citizens on the subject.

Atlanta Service Hearings Concluded.—The hearing in connection with the application of the Georgia Railway & Power Company, Atlanta, Ga., to the Railroad Commission of that State for permission to discontinue certain extra car services on fourteen different lines was concluded on Jan. 13 and the commission took the matter under advisement.

I. C. C. Ruling Accepted.—The Public Utilities Commission of Ohio has accepted the recent increased freight-rate decision set down by the Interstate Commerce Commission as a basis for intra-state rates. This decision has enabled all the electric lines in Ohio to increase their freight rates 5 per cent in accordance with the ruling of the Interstate Commerce Commission.

Service in Seattle.—An informal meeting between the representatives of the Public Service Commission of Washington and the officers of the Puget Sound Traction, Light & Power Company was held in Seattle on Jan. 9 to consider the subject of service. The company offered the schedule now operated in Seattle and figures on operating expenses and other facts pertinent to the subject at hand as a basis of study, so that the commission would be in a better position to judge whether improved service should be required under existing conditions.

Gentlemen's Agreement in Buffalo.—An understanding referred to in the Buffalo papers as a "gentlemen's agreement" has been reached regarding service complaints between Charles Rohlf, representing the Business Men's Central Council, and E. G. Connette, president of the International Railway. Under it provision is made for the settlement of service questions without their reference to the Public Service Commission. Devoe P. Hodson, Buffalo, a member of the commission for the second district, says he is prepared to make the suggestion informally to Mr. Connette that two-car trains be run during the rush hours.

Rehearing Denied in Albany.—The Public Service Commission for the Second District of New York has denied the application of the United Traction Company, Albany, for a rehearing on its recent order regarding improvements in service and equipment in Albany and vicinity. Charles F. Hewitt, general manager of the company, has appealed to the local civic associations for leniency toward the company, pointing to the statements embodied in the recent letter of C. F. Sims, vice-president of the company to the commission, as referred to in the *ELECTRIC RAILWAY JOURNAL* of Jan. 16. It is regarded as likely that certiorari proceedings will be resorted to.

Decrease in Accidents in Akron.—The Northern Ohio Traction & Light Company, Akron, Ohio, reports a decrease in accidents of 34 per cent for 1914 as compared with 1913. The fatalities decreased 45 per cent and personal injuries decreased 11 per cent. The number of vehicles struck decreased 43 per cent, pedestrians struck by cars decreased 30 per cent, persons injured getting on cars decreased 33 per cent, and persons injured getting off cars decreased 35 per cent. In 1913 nine employees of the company were killed and in 1914 two employees were killed. These figures were conveyed to the employees of the company in a circular addressed to them on Jan. 9 by E. H. Clinedinst, supervisor of safety.

Boston Subway Station Issue.—In a recent statement, President W. A. Bancroft of the Boston Elevated Railway pointed out that the demand for an additional station at Arlington Street in the new Boylston Street subway is based upon a misconception of the traffic requirements on the part of local business interests. A recent count shows that 52.2 per cent of the passengers riding through or past Arlington Street would not be affected by such a station and that of those who would be affected, 98.1 per cent would be accommodated. The district in dispute is well served by surface lines which interchange transfers with the subway cars. A bill has been introduced into the Legislature to require the building of a station at this point.

Proceedings to Inforce Service Orders.—The Public Service Commission for the First District of New York has instructed its counsel to proceed by mandamus or injunction to stop alleged violations of its orders by the Interborough Rapid Transit Company in the subway and by the New York Consolidated Railroad and Nassau Electric Railroad on the West End line in Brooklyn. The Interborough Company is charged with violating the commission's order during the non-rush hours, when it is required to provide seats enough for all passengers offered during every twenty-minute period. The Brooklyn companies are charged with violating the order requiring the operation of five-car trains on a ten-minute headway during non-rush hours.

Personal Mention

Mr. W. A. Bibb has resigned as general manager of the North Alabama Traction Company, New Decatur, Ala.

Mr. C. H. Robertson has resigned as general manager of the Central California Traction Company, Stockton, Cal.

Mr. E. B. Thompson has been elected treasurer of the Batavia (N. Y.) Traction Company, to succeed Mr. Frank W. Garnier, who resigned several months ago.

Mr. Norman Morrison, a division superintendent of the Birmingham Railway, Light & Power Company, Birmingham, Ala., has been appointed general manager of the North Alabama Traction Company, to succeed Mr. W. A. Bibb, resigned.

Mr. W. L. Davis, formerly connected with the Texas Traction Company, and the Southern Traction Company, Dallas, Tex., in the capacity of auditor, has resigned his connections with these companies to enter the public accounting field in Cincinnati.

Mr. P. O. McCarthy has resigned as superintendent of the Fort Smith Light & Traction Company, Fort Smith, Ark., owing to ill health and has been transferred to the San Diego Consolidated Gas & Electric Company, San Diego, Cal., also owned and operated by H. M. Byllesby & Company, Chicago.

Mr. B. L. Callahan, for six years manager of the new business department of H. M. Byllesby & Company, having direction of the new business activities of the thirty-five properties under its management, has resigned to become district manager of the Westinghouse Lamp Company, with offices and headquarters at Chicago.

Mr. Arnold von Schrenk, formerly general superintendent of the United Traction Company, Albany, N. Y., has become associated with the firm of Von Schrenk & Kammerer, consulting engineers, St. Louis, Mo. Mr. von Schrenk is taking the place of Mr. A. L. Kammerer, who has temporarily retired from business to take a much needed rest.

Mr. T. Curtis has been made division superintendent of the Aurora, Elgin & Chicago Railroad, with headquarters at Aurora, Ill. His duties will include supervision over the Aurora city lines as well as the interurban lines to Yorkville and to Elgin. Mr. Curtis has been in the employ of the engineering and operating departments of the company for a number of years.

Mr. F. E. Fisher, general superintendent of the Chicago, Ottawa & Peoria Railway, Joliet, Ill., was elected president of the Illinois Electric Railways Association at the annual meeting held in Chicago on Jan. 15, 1915.

Mr. Fisher was born in Elyria, Ohio, in 1860 and entered steam railroad service at the age of twenty-one. He spent seventeen years in various branches of the transportation and traffic departments of the central branch of the Union Pacific, the Wabash, the Chicago, Peoria & St. Louis and the Ohio Southern Railroads. In 1898 he entered electric railroading as general manager of the Joliet Railroad, then owned by Mr. W. B. McKinley and his associates. During the six-year period he was in



F. E. FISHER

charge of this property, it was entirely rehabilitated and the Chicago & Joliet Electric Railway, a double-track interurban line, was constructed. In 1904 Mr. Fisher became associated with his brother, Mr. H. A. Fisher, and his nephew, Mr. L. D. Fisher, who together promoted and constructed the Joliet, Plainfield & Aurora Railroad, and in 1906 built the Joliet & Southern Traction Company's line between Joliet and Chicago Heights, Ill. In 1911 Mr. Fisher again accepted a position with the McKinley interests, taking charge of the construction of an extension of the Chicago, Ottawa &

Peoria Railway between Morris and Joliet, Ill. Upon the completion of this extension he was made general superintendent of the entire property, which position he now holds.

Mr. W. B. Tarkington has been appointed superintendent of the Fort Smith Light & Traction Company, Fort Smith, Ark., in charge of the operation of the railway. Mr. Tarkington has long been connected with electric railway and steam railroad work, having begun his career in the mechanical department of the Chicago & Northwestern Railroad. In his steam-road service he was advanced to the position of division master mechanic on the Iowa division of the Chicago & Northwestern Railroad, which position he resigned to become connected with the Omaha & Council Bluffs Street Railway, Omaha, Neb., as general superintendent. Later he accepted a position as superintendent of transportation of The Milwaukee Electric Railway & Light Company, Milwaukee, Wis. Other electric railway positions held by Mr. Tarkington include that of general superintendent of the Chicago & Southern Traction Company, Chicago, Ill., which he resigned in April, 1912, to become superintendent of the Rock Island Southern Railway.

Mr. H. T. Jones, whose appointment as general superintendent of the United Railroads, San Francisco, Cal., was announced in the *ELECTRIC RAILWAY JOURNAL* for Jan. 16, has been actively engaged in street railway work for thirty-three years. Mr. Jones was born in Bristol, England, in 1866. In 1882 he entered the employ of the late Sir Clifton Robinson, who was then engaged in constructing the Hight Hill cable railroad in London. In 1884 Mr. Jones operated the first car over this line, the first road of its kind in Europe. Mr. Jones remained in the London offices of the company until 1889. Sir Clifton then went to Los Angeles, Cal., to install a cable road there for the Los Angeles Cable Railroad, and Mr. Jones was appointed assistant superintendent. In 1890 Mr. Jones entered the employ of the Market Street Cable Railway, San Francisco, as conductor. Since that time he has remained in San Francisco and has steadily risen through the ranks to the position he now holds. After serving successively as inspector, car dispatcher and timetable expert, he was appointed superintendent of employment by Mr. Chapman when the United Railroads was organized in 1902, and in 1904 was made division superintendent. This position he held for nine years, at which time he advanced to the position of acting general superintendent. In addition to the usual duties of his office during this time, he was also continued as the company's timetable expert as well as chief of the employment bureau. In fact, Mr. Jones personally has employed all of the men in the rank and file which the United Railroads has added to its payroll since the company was formed in 1902. In the strenuous period after the earthquake and fire of 1906 and in the strike that followed he added much to his record for long and faithful service.



H. T. JONES

OBITUARY

J. Grant McCollum, of the Public Service Corporation of New Jersey, died of pneumonia at Newark on Jan. 13. Mr. McCollum became connected with the Public Service Electric Company on Jan. 26, 1914, as superintendent of construction of the Burlington power station and was transferred to superintendent of construction for the Essex power station at Newark when that work was started several months ago. Previous to entering the employ of the Public Service Electric Company he was connected with Westinghouse, Church, Kerr & Company. Mr. McCollum was graduated from Cornell University with the class of 1909. He was a member of Phi Kappa Sigma fraternity and was a Cerberus man. He was also a member of the Cornell University Club and Squadron C of Brooklyn.

Construction News

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

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

RECENT INCORPORATIONS

***Riverside, Rialto & Pacific Railroad, San Francisco, Cal.**—Application for a charter has been made by this company in California to build a 10-mile interurban railway to connect Riverside, Bloomington and Rialto. Capital stock, \$500,000. Incorporators: W. G. Henshaw, Tyler Henshaw, Henry Chickering, William H. Metcalf and William Lees.

***Palm Beach & Everglades Railway, Miami, Fla.**—Application for a charter has been made by this company in Florida to build a 40-mile railway from West Palm Beach to Lake Okeechobee. Charles H. Baker, New York, president; H. G. Geer, West Palm Beach, vice-president; James A. Moore, Hotel Halcyon, Miami, general manager; W. H. Da-Camera, secretary, and T. J. Campbell, West Palm Beach, treasurer.

FRANCHISES

***Birmingham, Ala.**—Henry Key Milner, president of the Milner Land Company, has asked the Council for a franchise to build an electric line from Fifteenth Avenue and Twentieth Street south to Key Circle in the Land Company's new division.

San Jose, Cal.—The San Jose Terminal Railway has asked the Council for an extension of time on its franchise in the northern part of San Jose. It is the aim of the company to build from Alviso through San Jose and the Willows district.

Santa Barbara, Cal.—The Riviera Company has asked the Council for a franchise for an extension east from the State Normal School in Santa Barbara. The franchise will be assigned to the Santa Barbara & Suburban Railway.

Meriden, Conn.—The Connecticut Company has asked the Council for a franchise for a line from West Main Street at Capitol Avenue along Capitol Avenue to Lockwood Street in Meriden.

New Haven, Conn.—The Connecticut Company has asked the Council for a franchise for a line on Whalley Avenue, New Haven, through either Hudson Street, County Street or Goffe Street into New Haven County property; also from West Main Street and Capitol Avenue, Meriden, along Capitol Avenue to Lockwood Street.

Carbondale, Ill.—The Murphysboro & Southern Railway has received a franchise from the Council in Carbondale. A. B. Minton, Murphysboro, president. [E. R. J., Jan. 9, '15.]

Quincy, Ill.—The Quincy & Western Illinois Electric Railway has asked the Council for a three-year extension of time on its franchise in which to begin the construction of its line between Quincy and Niota. Henry F. Dayton, Quincy, president. [E. R. J., Jan. 21, '14.]

Evansville, Ind.—The Board of Works has approved the franchise granted the Public Utilities Company for the extension of the Bell Street line from the present terminus at Kentucky Avenue to the city limits of Evansville.

Schenectady, N. Y.—The Schenectady Railway has received a franchise to extend its Nott Street line as far as the city line on Grand Boulevard in Schenectady.

Cincinnati, Ohio.—Mayor Spiegel of Cincinnati, Ohio, has signed the twenty-five-year franchise granted the Cincinnati, Newport & Covington Street Railway for the use of certain streets between the business district of Cincinnati and the Ohio River Bridge on Jan. 14. The City Council refused requests to reconsider the vote on the franchise ordinance, the formal action being taken Jan. 13. Notice has been served for a referendum vote on the franchise.

Corvallis, Ore.—Because it failed to complete and operate 2 miles of lines within two years from the time the franchises were granted, the franchises of the Portland, Eugene & Eastern Railway have been revoked by the City Council. The bonds of the company, amounting to \$5,000, put up as an evidence of good faith, has been declared forfeited.

***Knoxville, Tenn.**—M. K. Bell, Knoxville, will ask the Council for a franchise in Knoxville. This is part of a plan to build an electric line from Knoxville to Bristol and Newport, Tenn., 120 miles.

Dallas, Tex.—Edward T. Moore and associates, representing the Stone & Webster interests, have received a franchise from the Council on Ray Street, Wood Street, Akard Street, Jackson Street, Lane Street and Browder Street in Dallas. The franchise provides entrance facilities to the proposed interurban terminal station in Dallas. The station will be modeled in a general way after the large interurban terminal which is used by the electric railways which enter Indianapolis.

***Marshall, Tex.**—Business men from Shreveport have asked the Council in Marshall for a franchise to build an electric railway in Marshall and for right-of-way through Harrison County.

Ogden, Utah.—The Ogden, Logan & Idaho Railway and the Salt Lake & Ogden Railway have accepted the franchise to build over Lincoln Avenue between Twenty-third and Twenty-fourth Streets to the interurban terminal on Twenty-fourth Street between Grant Avenue and Lincoln Avenue in Ogden.

Clarkston, Wash.—The Council has granted a franchise to A. G. Nortz and associates for an electric railway in Clarkston. The electrical equipment will cost about \$15,000. The generators and transformers will be made after the order is placed. It is reported that the company will spend \$750,000 in the valley. [E. R. J., Jan. 2, '15.]

TRACK AND ROADWAY

Alabama City, Gadsden & Attalia Railway, Gadsden, Ala.—Plans are being made by this company to lay new track and build a loop in Gadsden.

Calico Rock, Ark.—Preliminary arrangements are being made by this company to build its line between Calico Rock and Hoxie. S. J. Johnson, Calico Rock, is interested. [E. R. J., Dec. 19, '14.]

Pacific Electric Railway, Los Angeles, Cal.—Plans are being considered by this company to extend its lines through the East Side to the station site at the end of East Eighth Street in Riverside.

Sacramento Valley Electric Railway, Sacramento, Cal.—During 1915 this company plans to build 17-miles of new track from Dixon to Woodland. Eventually this line will be built to Red Bluff.

San Francisco (Cal.) Municipal Railway.—In accordance with the instructions of the Supervisors, City Engineer O'Shaughnessy is preparing plans and specifications for the construction of the Church Street municipal railway line as far as the available money will carry it. The understanding now is that the proposition of creating an assessment district to pay for opening a new street over the hill may be dropped, and that only the city's bond fund will be drawn on for building the line. In this event it can be constructed as far as Twenty-Second Street. The original plan was to build it to Thirtieth Street in San Francisco. The company reports that in all about 9.28 miles of new track will be constructed by it in San Francisco during 1915.

Sandpoint & Interurban Railway, Sandpoint, Idaho.—During 1915 this company plans to build its 5-mile return line from Shoshone Falls to Twin Falls, Idaho.

Gary, Hobart & Eastern Traction Company, Hobart, Ind.—During 1915 this company plans to build 12 miles of new track to connect the towns of Glen Park, New Chicago and Hobart.

New Albany, Ind.—The Louisville & Southern Indiana Traction Company, which operates the New Albany city lines, has been notified by the city authorities that it must remove unused tracks in Market Street, between East Fourth and East Thirteenth Streets, ten days being allowed for compliance with the order. The track formerly was used by the Silver Hills line.

Cedar Rapids & Marion City Railway, Cedar Rapids, Ia.—About 4 miles of new track will be built by this company during 1915.

Mississippi Valley Electric Company, Iowa City, Ia.—During 1915 this company plans to build 1½ miles of new track.

Arkansas Valley Interurban Railway, Wichita, Kan.—As soon as the weather permits, this company plans to begin the construction on the extension to Hutchinson. During the year 1915 this company plans to build 22 miles of new track.

Louisville (Ky.) Railway.—Residents of sections in Louisville and vicinity now without electric railway are presenting petitions addressed to officers of this company and the Louisville & Interurban Company, for extensions of the lines and service of these companies. Among the extensions suggested are lines to Parkland and Mount Washington.

Texas-Louisiana Traction Company, Shreveport, La.—Plans are being considered by this company to build its line between Shreveport and Marshall. It is planned eventually to build extensions through Longview, Tex., Vivian, La., and Mansfield, La. A. B. Blevins, Jefferson, president. [E. R. J., Oct. 5, '15.]

Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, Minneapolis, Minn.—During 1915 this company will complete its 14½-mile line.

St. Paul Southern Electric Railway, St. Paul, Minn.—The 30-mile line between Cannon Falls, Zumbrota, Pine Island and White Rock will be built by this company during the year 1915.

Moberly, Huntsville & Randolph Springs Railway, Moberly, Mo.—At a recent meeting of the directors of this company plans were considered to begin work in the spring on this line to connect Randolph Springs, Moberly and Huntsville. Charles H. Dameron, Huntsville, president. [E. R. J., April 25, '14.]

United Railways of St. Louis, St. Louis, Mo.—This company is asked to consider plans to extend the Lee Street line from its present terminus on Taylor Avenue to the city limits in St. Louis.

Northern Ohio Traction & Light Company, Akron, Ohio.—During 1915 this company plans to build 2.67 miles of new track.

Cleveland, Southwestern & Columbus Railway, Cleveland, Ohio.—It is reported that this company contemplates the construction of an electric railway from Berlin Heights, via Wakeman to New London and thence to Plymouth, New Washington and Bucyrus.

Oklahoma (Okla.) Railway.—Preliminary arrangements are being made by this company to begin work on the 17-mile extension between Edmond and Guthrie.

Morrisburg & Ottawa Electric Railway, Ottawa, Ont.—During 1915 this company plans to build its 50-mile line between Ottawa and Morrisburg.

Southern Oregon Traction Company, Medford, Ore.—About 1 mile of new track will be built by this company during 1915.

Harrisburg, Pa.—The Public Service Commission has refused the application of the Perkiomen Electric Transit Company, a Delaware corporation registered to do business in Pennsylvania, for a certificate of public convenience to permit it to operate a trackless trolley system on public roads in this State.

***Monaca, Pa.**—John W. Reid, John J. Allen, D. J. Mitchell and H. L. Grimmell, citizens of Monaca, will organize a company to build an electric railway between Monaca and Coraopolis.

West Penn Traction Company, Pittsburgh, Pa.—A 7-mile line will be built by this company between Leisenring and Uniontown during 1915.

Charleston Consolidated Railway & Lighting Company, Charleston, S. C.—Contracts have been awarded and work will be begun at once by this company on its 2-mile extension to North Charleston.

Columbia Railway, Gas & Electric Company, Columbia, S. C.—Plans are being made by this company to lay new track on Elmwood Avenue in Columbia.

Chattanooga (Tenn.) Traction Company.—This company plans to build 20 miles of new track during 1915.

Brenham, Tex.—Plans are being considered to build a 15-mile line between Brenham, Independence, William Penn and Bryan. Preliminary details will be settled and actual work will be begun in the near future. [E. R. J., Dec. 19, '14.]

Corpus Christi Railway & Light Company, Corpus Christi, Tex.—About 1 mile of new track will be built by this company in Corpus Christi during 1915

San Antonio Traction, Gas & Electric Company, San Antonio, Tex.—Preliminary arrangements are being made by this company for extensions and improvements of its lines in San Antonio.

Ogden (Utah) Rapid Transit Company.—Plans are being contemplated by this company to extend its tracks from Wellsville to Brigham City.

Blue Ridge Light & Power Company, Staunton, Va.—Actual construction of this railway has been begun. The line will be about 40 miles long.

Portland, Vancouver & Northern Railway, Vancouver, Wash.—Preliminary arrangements are being made by this company to begin work about May 1 on the construction of this electric line to connect Portland, Ore.; Vancouver, Wash., and interurban lines in Clarke County, Wash. Capital stock, authorized, \$300,000. Officers: Henry Crass, 511 United States Bank Building, Vancouver, Wash., president; G. W. Ford, Vancouver, Wash., secretary. [E. R. J., Jan. 9, '15.]

Charleston-Dunbar Traction Company, Charleston, W. Va.—Plans are being made by this company to build 18 miles of new track during 1915.

SHOPS AND BUILDINGS

Pacific Electric Railway, Los Angeles, Cal.—Plans are being considered by this company to extend its lines through the East Side to the station site at the end of East Eighth Street in Riverside.

Pacific Electric Railway, Los Angeles, Cal.—Work has been begun by this company on its new depot at Gardena.

Piedmont & Northern Railway, Charlotte, N. C.—This company has opened its new passenger station on Spring Street in Spartanburg.

POWER HOUSES AND SUBSTATIONS

United Railroads, San Francisco, Cal.—This company contemplates building a new substation in the Richmond District in San Francisco.

Potomac Electric Company, Washington, D. C.—An order for one 150-kva three-phase, sixty-cycle, 2200-volt high-tension, 240-220-volt low-tension O. I. S. C. transformers has been placed by this company with the Westinghouse Electric & Manufacturing Company.

Cushing (Okla.) Traction Company.—This company has placed an order with the Westinghouse Electric & Manufacturing Company for one 500-kw, 1500-volt, 900-r.p.m. d.c. geared generator with compound winding; one turbine complete with reduction gear, condenser, etc., and one three-panel marble switchboard for its power house in Cushing.

Utah Light & Traction Company, Salt Lake City, Utah.—The installation of an added unit to the company's storage-battery system has been completed, increasing the capacity of the system between 25 per cent and 30 per cent. The original storage-battery system was installed six years ago in the company's power station and transmission plant in the square bounded by First South and Second South Streets and Main and West Temple Streets. The plant was installed as an emergency equipment for use in the event of trouble with the generating and transmission plants supplying service in the business district.

Virginia Railway & Power Company, Richmond, Va.—A 375-kva a.c. generator has been ordered by this company from the General Electric Company.

Puget Sound Traction Light & Power Company, Seattle, Wash.—Two 500-kva, three-phase, sixty-cycle, 52,500-volt high-tension, 13,800-volt low-tension out-door O. I. S. C. transformers have been ordered by this company for its power house in Seattle.

Manufactures and Supplies

ROLLING STOCK

Warren (Pa.) Street Railway will purchase one interurban car during 1915.

Lincoln (Neb.) Traction Company is contemplating the purchase of one snow sweeper during 1915.

Concord, Maynard & Hudson Street Railway, Maynard, Mass., will equip all its open cars with double running boards.

St. Paul (Minn.) Southern Electric Railway will purchase during 1915 six additional passenger cars of the same general type as those recently purchased.

Long Island Railroad, New York, N. Y., noted in the ELECTRIC RAILWAY JOURNAL of Jan. 2, 1915, as expecting to purchase twenty all-steel trailers, has ordered this equipment from the Standard Steel Car Company.

Lewiston, Augusta & Waterville Street Railway, Lewiston, Me., has ordered one motor freight car, two trailer box cars and eight flat cars from the Laconia Car Company. This order includes truck equipment for all the cars.

Toronto (Ont.) Civic Railway has placed an order through Works Commissioner Harris, of the city of Toronto, with the Preston Car & Coach Company, for three double-end, single truck, pay-as-you-enter cars, mounted on Brill 21-E trucks, 8 ft. wheel base, cast iron wheels. The electrical equipment will be G.E.-80 with K-10 control. Car bodies will be 21 ft. long with clear space inside of sheathing in each vestibule of 6 ft. The cars are to be especially wide for single-truck cars, being 8 ft. 5-in. over side sheathing. The vestibules are to be extra wide, being 8 ft. wide. The outside of cars will be painted Pullman color; interior will be finished with golden oak; the seats will be of the "walk-over" style cross seats, upholstered in woven rattan, spring upholstered cushions and backs. There will be six automatic ventilators in the ceiling of each car. Sano hand straps will be fastened to the ceiling over each short longitudinal seat at each end of car. The seating capacity will be 32.

Boston (Mass.) Elevated Railway, noted in the ELECTRIC RAILWAY JOURNAL of Jan. 9 as having ordered seventy-five center-entrance trailers from The J. G. Brill Company, has specified the following details for this equipment:

Weight of car body,	Underframe metal
18,000 lb.	Bumpers angle iron
Bolster centers, length,	Couplers Tomlinson
24 ft.	Curtain fixtures,
Length over vestibule,	Cur. Sup. Co.
48 ft. 2½ in.	Curtain material..Pantasote
Width over sills,	Hand brakes Brill with
8 ft. 5 in.	Pittsburgh drop handle
Width over all. . 8 ft. 9¾ in.	Journal boxes Brill
Height, rails to sills,	Sash fixtures Brill
variable	Seats Brill "Winner"
Body all-steel	Seating material,
Interior trim aero metal	mahogany slats
Headlining.. Agasote sides.	Springs Brill
carlin finish, upper deck	Trucks Brill 53-F
Roof monitor	Ventilators Perry

TRADE NOTES

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., has appointed L. F. Brahmer, formerly with the Chicago Association of Commerce's smoke abatement and terminal electrification engineering staff, to a position in its line material division at East Pittsburgh, Pa.

National Carbon Company, Cleveland, Ohio, has appointed W. H. Arkenburgh, for a long time publicity manager of the Union Switch & Signal Company, to a position in its sales department. Mr. Arkenburgh will have charge of railway and signal work in the Canadian territory.

Bucyrus Company, Milwaukee, Wis., prints in the January, 1915, number of the *Excavating Engineer* an article on successful results from electrical shovel operation on the Wilkes-Barre (Pa.) Railway on which an electric revolving shovel manufactured by this company has been operating for about a year.

John A. Roebling's Sons Company, Trenton, N. J., on Jan. 18 suffered a complete destruction of its insulated wire plant. The shops and machinery for the manufacture of all kinds of wire rope and bar iron, steel and copper wire were not damaged and are still running.

Anchor Webbing Company, Woonsocket, R. I., has changed its Chicago agency from F. T. Finney, 614 West Adams Street, to E. P. Bartlett, 1368-1370 Grand Avenue. This company has also established a new agency in St. Louis, Mo., in the name of Brown & Hall, 620 Central National Bank Building.

Hoeschen Manufacturing Company, Omaha, Neb., has recently received orders from the Oregon Electric Railway, Detroit (Mich.) United Railway, Spokane & Inland Empire Railway, Pennsylvania Railroad, Louisville & Nashville Railroad, and several other steam roads for its magneto-mechanical highway crossing bell.

John R. Dickey, director and sales manager of the Philadelphia Holding Company, has taken the agency of the Fort Pitt Spring & Manufacturing Company, Pittsburgh, Pa. Mr. Dickey will look after the steam railway and industrial interests of that company in the Philadelphia district, but is prepared to handle electric railway spring business without any territorial limit.

Bemis Car Truck Company, Springfield, Mass., is located in a new, enlarged plant. On Dec. 14 last year the old plant of the company was destroyed by fire and on Dec. 22 the company moved to a new plant with new machinery and enlarged facilities generally for the production of trucks, wheels, axles, bearings, springs, gearing, castings and special machinery which it manufactures.

E. P. Roberts, Cleveland, Ohio, will resign, effective Feb. 1, 1915, from his position as commissioner of smoke abatement and will reopen his office as consulting engineer about that date. From 1893 to 1912 Mr. Roberts acted as consulting engineer for a large number of electric railways, electric light and other public utility corporations and also many manufacturing plants. In addition he will now make a specialty of smoke abatement.

Esterline Company, Indianapolis, Ind., manufacturer of "Golden Glow" lamps, has made a sales connection for the United Kingdom with the Forest City Electric Services Supply Company, Clegg's Court, Chapel Street, Salford, England, and for the Kingdom of Italy with Giovanni Chechetti, Piazza Sicilia No. 1, Milan, Italy. These European concerns will have the exclusive sales rights for "Golden Glow" equipment in their respective territories, and will be direct sales representatives. The Esterline Company has also appointed Firth & Marshall, 81 New Street, New York, as its Eastern representatives for curve drawing instruments, pyrometers and production recorders. This firm will handle the state of New York, including New York City, and the New England states.

ADVERTISING LITERATURE

American Electrical Works, Phillipsdale, R. I., has issued a price list of Jan. 15, 1915, of its wire and cables.

Electric Railway Equipment Company, Cincinnati, Ohio, has issued Catalog E, which illustrates its lamp standards for supporting type C high efficiency Mazda lamps, also ornamental lamp brackets of different designs to be attached to trolley span-wire poles.

Allis-Chalmers Manufacturing Company, Milwaukee, Wis., has issued Bulletin No. 1533, superseding Bulletin No. 1524, which contains a price list of its repair parts for auxiliary air-brake apparatus, including Types E and E-3 electric governors, ½-in. and ¾-in. rotary engineer's valve, ½-in. slide engineer's valve, brake cylinders, air gages, stop cocks, drain cocks, safety valves, whistles and valves, reservoir and hangers, box and cage, fuse and base, insulators, hose and couplings and switches.

Pelton Water Wheel Company, San Francisco and New York, has issued Bulletin No. 8, which illustrates and describes its Pelton-Doble tangential water wheels and Pelton-Francis turbines for direct connection to generators in hydroelectric plants. The water wheels range in units capable of developing from 20 hp to 20,000 hp, delivered from one shaft. The catalog contains illustrations of installations where both types of prime movers are employed, and also views of pipe lines furnished by this company.

Guaranty Trust Company, New York, N. Y., has issued a 111-page cardboard-bound book on the subject of railway equipment obligations. Short descriptions are presented of the more important equipment obligations of the principal railways in connection with date issued, outstanding amounts, interest dates and maturity dates. By way of introduction the book contains a general discussion bearing upon the history and present investment position of equipment obligations. An analysis is also made of how equipment obligations have fared in receiverships and reorganizations.

Armspear Manufacturing Company, New York, N. Y., has issued Bulletin No. 15, which describes its spheroidal lens railway lamps for night indication, including tail-lights, classification, switch and semaphore lamps. With this spheroidal lens lamp it is possible to procure an effective long range of slightly less intensity than the concentrated light given from a smooth faced lens, but performing all the functions of the present lamps and in addition a divergent light is provided covering an arc of 90 deg. from each section. The bulletin contains a colored graphical drawing which illustrates the range and limits of the smooth-faced semaphore lens in comparison with the spheroidal lens. The lens is of multi-colored sections. From one to four sections are used, according to the service. Each section is contiguous, and when assembled and locked in position becomes rigid and air-tight, virtually making a luminous globular lamp transmitting all the rays impinging on the glasses.

NEW PUBLICATIONS

Ancient Double Entry Bookkeeping. By John B. Geijsbeek. The Ronald Press Company, New York, 1914; 182 pages, illustrated; buckram, \$5, prepaid.

While in many respects this book is for the scholar, it contains material that should be of absorbing interest to everyone interested in accounting practice. Important as the accounting profession is in the affairs of modern business, it is popularly supposed that such work has been almost entirely developed in the last few decades as a direct result of the very complexity of the business organizations whose transactions it records. It may come as a surprise, therefore, to have presented to one's view translations in English of the first known writings on the subject of double-entry bookkeeping, beginning with those of Pacioli in Italy in 1494. From these it appears that even in that day there were well-defined principles of bookkeeping and accounts, and in endeavoring to systematize the recording of commercial transactions the ancient practitioners encountered many of the problems met to-day. The chief value of Mr. Geijsbeek's book is that it makes available to all the contents of medieval books that are either out of print or so rare as to be out of reach of the average accountant. Photographic reproductions from the original authors in various languages are shown on the left-hand pages, with a modern English translation on the right, and the book is replete with illustrations of early forms. Through these means the accountant of to-day can see how faithfully he is following the footsteps of his medieval predecessors. If he is a real book-lover and is interested in more than the humdrum of his every-day practice, he will find in this book not only an intrinsically valuable addition to his library but also a means of giving him that breadth of view that comes from a real knowledge of the history of his profession.

Practical Rate Making and Appraisalment. By William D. Marks; office, President's House, South Hadley, Mass.; 269 pages; cloth, \$2, postpaid.

The author of this book has endeavored to collate, digest and systematize the results of his experience in appraisal and rate-making cases in the United States. A few of the briefer reports are printed in full, and then the general principles involved in rate making and appraisalment are discussed and illustrated by practical examples of their application. Some of the most important chapters are those dealing with the various bases of appraisals, overhead charges, law of demand, London sliding scale, and quantity rates for electricity. It is the author's opinion that the utmost caution and thoroughness of research must be exercised by appraisers, and that in most instances appraisals must be made regardless of book values. Almost all the examples used in the book are from the gas and electric light fields, but practical lessons for electric railways can be drawn from the information given.