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SINKING FUND ACCOUNTING Although electric railway sinking funds are not so prevalent as in those days when rapidly recurring obsolescence almost placed railways in the category of "wasting-asset" companies, quite a number are still used in connection with existing mortgages. In handling them, railway accountants have often been confronted with fine problems, not all of which seem to have been solved to the satisfaction of every one. For this reason, special interest should attach to the article by W. H. Forse, Jr., published elsewhere in this issue, which contains valuable notes on the proper accounting treatment of various points and is in the main an example of that interpretative thinking which characterizes the modern accountant. Much of the confusion in regard to sinking fund accounting, we suspect, arises from the lack of understanding of its basic theory and also from a sometimes lazy and a sometimes wilful carelessness in the use of accounting terms. If some men know the difference between sinking funds and sinking fund reserves—that sinking fund accounting affects only the real or asset and liability accounts, while sinking fund reserve accounting concerns only the surplus account and appropriations therefrom—it often is not evident from their words. This should not be, for no railway accountant should fail to do all in his power to help place utility accounting on an exact and scientific basis.

BEST WISHES TO THE BOSTON ELEVATED The change in the presidency of the Boston Elevated Railway, announced elsewhere in this issue, comes at a time when the company is facing one of the greatest crises in its history. It is reason for congratulation that the road is to retain the able services of its former chief executive as chairman of the board of directors while placing its immediate administration in the hands of one of the most brilliant executives and exponents of the "square deal" among the younger men which the electric railway industry has produced. Engineers, too, must feel gratified that another of their own profession has been found worthy to fill so important a place in the transportation field as the presidency of the Boston system. The administration of the Boston Elevated has always called for the broadest cooperation among the small group of men to which the direction of its affairs has been committed. The devotion of these men to the best interests of the railway for years has been marked by a willingness of individuals to seek results first and to let personal fame take care of itself. The combined talents of the organization will be needed as perhaps never before in the forthcoming difficult task of securing an adequate return for the

services rendered the public. The best wishes of the industry and of this journal go to Chairman Bancroft and President Brush as each takes up the duties of his new office.

VIOLENCE IN NEW YORK STRIKE During the past week there has been an increase in the number and virulence of the attacks by strikers and their sympathizers on electric cars operating in New York. Citizens who are exercising their right to ride on the cars are being made the target of stones and other missiles, and serious injuries have resulted. These outrages mark the disappointment and desperation of the strikers in their failing cause. The responsibility of this lawlessness is directly upon the leaders of the strikers. Whether they have openly advocated assaults on the cars may be open to question, but we have seen no evidences of active measures on their part to stop these outrages. The willingness to accept such benefits as they think will result from these assaults makes the strike leaders participators in them in fact even if not under the law. We do not believe, however, that the New York police will permit the establishment of any reign of terror in this city. The sentiment of the city, the precedents in the case of previous outbreaks and the performance of the authorities in this particular contest, all indicate that disorder will not be tolerated. The physical difficulties of preventing sporadic cases of attack or of apprehending the perpetrators when such an attack is made, we admit, are great. Nevertheless the police department of New York has had for many years the reputation of being "the finest" that we believe it is equal to the task. The announced decision of the district attorney to seek indictment for assaults on cars under Section 1991 of the Penal Code which provides penitentiary sentences of from five to twenty years on conviction may also act as a deterrent.

KEEPING STOCKHOLDERS INFORMED A noteworthy example of the special reports that might be issued to enlighten stockholders on matters affecting their company, is the one recently sent out by the United Railways of St. Louis, as noted elsewhere in this issue. Feeling that the stockholders were especially interested in the condition of the property after the payment of the \$1,839,205 of mill tax judgments, the management decided that it was an opportune time not only to explain this point but also to outline the important problems now confronting the company. Consequently a special report was issued for the first six months of 1916, as elaborately constructed

as the regular annual report and presenting in detail the position of the company concerning its power supply, taxes, franchises, maturing securities and future construction needs. We cannot emphasize too much the desirability of such reports. It is customary, of course, to issue special notices to stockholders about reorganizations or changes in corporate affiliations, and certain progressive companies issue monthly or quarterly financial statements, but special reports could be used more extensively to explain to stockholders unusual expenditures, unexpected operating conditions, the settlement of long pending questions and changes in company policy. One of the four major methods of establishing good public relations, as we stated in the outline on this subject in the *ELECTRIC RAILWAY JOURNAL* of Sept. 2, is to have a clean internal financial history, in the securing of which special reports to stockholders constitute a material and most important help. The question of the cost of such reports will be raised, but in this connection it will be well to bear in mind that in public relations work a penny-wise policy can very easily be carried to a disastrous extreme. An important feature of the St. Louis report is the data on the power situation of the company, on which there has been some public discussion. An abstract of this part of the report, giving the rates paid for hydraulic and steam power and the future "power" policy of the company, is published on pages 531 and 532.

"REINFORCED STEEL MAGNET" FOR DALLAS, TEX.

The new interurban terminal in Dallas, Tex., which was opened to the public this month, not only provides excellent traffic accommodations for the four lines entering Dallas, but it has also gone a long way in fostering the good will of the community which it serves. The terminal is an eight-story modern office building with a spacious waiting room on the main floor and the terminal tracks at the rear. In the construction of the building 90 per cent of the contracts were given to local concerns, and at the opening reception a large sign referred to the building as a huge reinforced steel magnet which would attract millions of visitors to Dallas each year. The fact that these interurban lines carry 6,000,000 passengers annually and that only 35 per cent of these make local trips shows that the railway company's prediction is within reason. Thus it was particularly emphasized that the prosperity of the city and that of the interurban lines go hand in hand, and that the new enterprise, by stimulating travel to Dallas, will increase the local trade and boost the "Buy It in Dallas" movement. As a means of further advertising the interurban lines, the railway officials had moving pictures taken of the throngs that crowded the building on the opening day. These pictures will be shown in one of the leading Dallas theaters and in many other cities of Texas.

The terminal, including land, building and tracks, cost about \$1,500,000. It thus belongs in the class of expensive electric railway terminals such as have been built at Newark, N. J.; Milwaukee, Indianapolis, Denver, Los Angeles, Cal.; Oklahoma City, and Vancouver,

Can. There are other and less expensive terminals also in smaller cities. The building of such terminals indicates that the railways consider it a paying investment to have themselves represented by buildings which appeal to the civic pride of their communities as well as to increase the railway facilities. By the use of such a terminal station instead of the plan of looping the interurban tracks through the city, the public is provided with an attractive waiting quarters with comfortable rest rooms and other conveniences; a common transfer point is obtained, and the railway has much better facilities for selling tickets and handling traffic.

COMPANY SECTION EXHIBIT AT THE CONVENTION

The American Association committee on company sections and individual membership is planning what should be a very instructive and attractive feature of the convention. The sections have been asked to demonstrate their work by means of exhibits, and the results of their efforts will be viewed with interest not only by the representatives of companies which already have sections but, it is hoped, especially by those which have not. While the section movement is still in its infancy, the sections are numerous enough to make a creditable showing. By so doing, they will help tremendously in stimulating interest in the movement and they will reflect credit upon their companies and themselves. Tangibility is important in any line of work, for as long as claims as to benefits are nebulous and general they do not carry much weight. Visible testimony is convincing and compels attention.

It is true that this particular kind of work does not lend itself readily to illustration, but that it can be illustrated in unique and attention-compelling ways can readily be demonstrated. The main thing is for the most ingenious person or persons available in each section to concentrate attention on the matter at once, calling in the assistance of the publicity department of the company if necessary, so that ideas of such originality will be generated that they will in turn produce the enthusiasm necessary for a live exhibit.

Without venturing to suggest in detail how the exhibits can be made most effective, one or more of the following items should certainly be included in each: Neatly lettered charts on a fairly large scale could be used to show the growth of the section, the proportion of available men enrolled, the subdivision of the membership among the departments of the company and other statistics which lend themselves to graphical presentation. First-class photographs, preferably framed uniformly, illustrating social events, "stunts," dramatic performances, groups of officers and of members at meetings, etc., would be particularly effective. Enlargements would be best for this purpose as the pictures must be viewed from some distance. Manuscripts of papers rendered at meetings could be arranged for ready inspection, and they would be most attractive if inclosed in soft leather or cloth covers. Samples of advertising matter used in announcing section events would be excellent material for the exhibit because these were necessarily designed to attract attention. Collections

of clippings from newspapers and technical journals should also be effective as showing the impression made by the section upon the community and the outside world. The value of getting such an exhibit as this together is twofold: In the first place it serves the general publicity purposes outlined above, and, second, it forces the section to review its own activities carefully and thus cannot but stimulate to further effort.

ARE ELECTRIC RAILWAY ENGINEERS SUPERFICIAL?

The members of the American Electric Railway Association and its affiliated associations have now in their hands a large amount of text of reports which are to be presented at the Atlantic City convention. Among these, the reports of the Engineering Association committees are conspicuous not only on account of the bulk of the pamphlets containing the preprints, but because they show an enormous amount of detail work in collecting data and arranging them for convenient reference. All of these reports will be fully covered in the report issue of the *ELECTRIC RAILWAY JOURNAL*, that of Oct. 14, wherein the reports will be abstracted at length and an editorial study of their contents will be presented. In the intervening three weeks, however, serious study will be given to all of the reports, but those of the Engineering Association will require the most effort on account of their wide scope and the large number of pages of text which they comprise.

Take for example the reports of the committees on power generation and distribution which together contain more than 100 pages of text, mostly data and specifications. Some study will obviously be required to master the contents of these reports. When one considers the attention given to 100 pages of text in an engineering college course of study, he realizes that a superficial examination of these reports will neither prepare him to participate in the discussion at Atlantic City nor intelligently to read the abstracts of the discussion in the report issue of the *ELECTRIC RAILWAY JOURNAL*. Take for more detailed examples the tables of data on rotary converters and their transformers, the tables of operating and cost data on power generation, the elaborate statistics on third-rail construction, the specifications for overhead line material, the treatise on concrete pole design, and other such material. While the reports on power generation and distribution have been cited as examples, exactly the same remarks can be applied to the report on way matters, that on equipment and several others.

There are two ways of appropriating the results of the work necessary in getting together such data as are contained in these reports. One may say "That's fine stuff; I shall file it for reference and look it up when I need it"; or he can treat the text as a lesson assigned to him for study by the industry, and on which he will be expected to recite either at the convention or when the first problem requiring the use of the data arises. Foreign engineers say that American engineers are superficial, that we do not study deeply into the problems which we attack. There is a good chance between the present date and that of the convention to

demonstrate that this is not so, at least as far as electric railway engineers are concerned.

NEW YORK'S LUCKY STAR

For many years New York City has been lucky in that its local transportation affairs have not been dominated by any irresponsible outside labor influences, but many citizens in the hustle and bustle of metropolitan life have failed fully to realize this fact. If they do not do so now, however, after the strike events of the last two weeks in the city, they are dead to the meaning of current events. The repudiation of the settlement plan of Aug. 7 by the union employees of the Third Avenue Railway and the Second Avenue Railroad, characterized by Mayor Mitchel and Chairman Straus of the Public Service Commission as an act without justification, shows in all probability what would have been the future attitude of the union men and leaders toward the "sacredness" of the settlement plan had it remained in force.

It is well for the city, therefore, that the exposé has come at this early date, and now we hope the public will better understand why the railways, none of which was opposed to collective bargaining of its employees directly with the management, refused recognition of the Amalgamated Association; why practically all of the Interborough Rapid Transit employees saw fit to maintain their own union in spite of the attempted proselyting of the Amalgamated Association; why they remained peaceably at work, while the misguided employees of other lines, completely unconcerned, violated their peace agreements solely for the profit of the Amalgamated Association, and why the proposal of a general sympathetic strike has up to this time been so coldly received by labor leaders in general.

As a matter of fact, we believe that the public is in a better position to understand such things than it was a short time ago. The hold-up of Congress by the four steam railroad brotherhoods, the contemptuous disregard of the settlement agreements in New York and the palpable efforts to obtain through the assistance of public officials what neither justice nor equity would countenance—all these indicate too clearly the habitual weapons of a certain type of unionist in whose good faith it would be folly to place much trust. Nor has the threat of a general sympathetic strike in New York City served any other purpose than to show to the citizens of the city how far their convenience would be sacrificed to bolster up a deservedly losing cause.

It is indeed fortunate for New York that the Interborough Rapid Transit Company, knowing the character of the unionists with whom it would have to deal, avoided all the evils that would have resulted therefrom and assured a more amicable and a more nearly permanent peace to its employees and itself by encouraging the men to form their own internal brotherhood. Fortunate, too, is it that the unions on the surface lines saw fit to throw down the gauntlet as a result, for that course has without doubt secured for New York freedom from the unbridled domination of an outside transportation union for many years to come.



SEVEN THROUGH TRACKS SWINGING INTO TERMINAL YARD. VIEW TAKEN FROM POSITION A ON TRACK LAYOUT



SEVEN THROUGH TRACKS LEAVING TERMINAL YARD. VIEW TAKEN FROM POSITION B ON TRACK LAYOUT

Eight-Story Interurban Terminal Building and Tracks in Dallas, Tex.

Dallas Railway Completes Seven-Track Interurban Terminal

By EDWARD T. MOORE

Local Manager Dallas Street Railway and Lighting Properties

WHILE it is not the largest, either in height or track capacity, the recently completed interurban terminal in Dallas, Tex., is one of the most perfect structures of its kind in America to-day. The builders have endeavored to combine the best features of the terminals of Indianapolis, Los Angeles, Columbus, Denver, Milwaukee, Oakland, Springfield, Terre Haute and Hamilton, Ont., and profiting by the experience and mistakes of others, they have succeeded in producing a splendid interurban terminal.

The four interurban lines entering Dallas use this terminal. These lines are the Waco division and the Corsicana division of the Southern Traction Company, the Denison-Sherman division of the Texas Traction Company, and the Fort Worth division of the Northern Texas Traction Company. The aggregate track mileage of these four divisions is 265, and last year the lines carried more than 6,000,000 passengers. Approximately 35 per cent of the passenger traffic on the four divisions mentioned consists of the passengers boarding and alighting from the cars within the

city limits of Dallas. These lines are now managed and operated by the Stone & Webster Management Association, and the terminal was designed and constructed by the allied Engineering Corporation. The ownership of the property, however, rests nominally with the Dallas Interurban Terminal Association, of which Charles F. W. Wetterer, Fred H. Farnham and the writer, who is manager of the Dallas street railway and lighting properties, are the trustees.

After the financial and franchise arrangements were completed last autumn, the Engineering Corporation on Dec. 11, 1915, began clearing the site for the terminal, and the structure was rapidly rushed to completion. In spite of the many difficulties experienced in securing material and supplies, the terminal was finished and formally opened to the public on Sept. 1, four months ahead of the scheduled time. The rapidity with which the building was completed is considered remarkable under the circumstances, and the contractors have thereby established an enviable reputation throughout the Southwest.

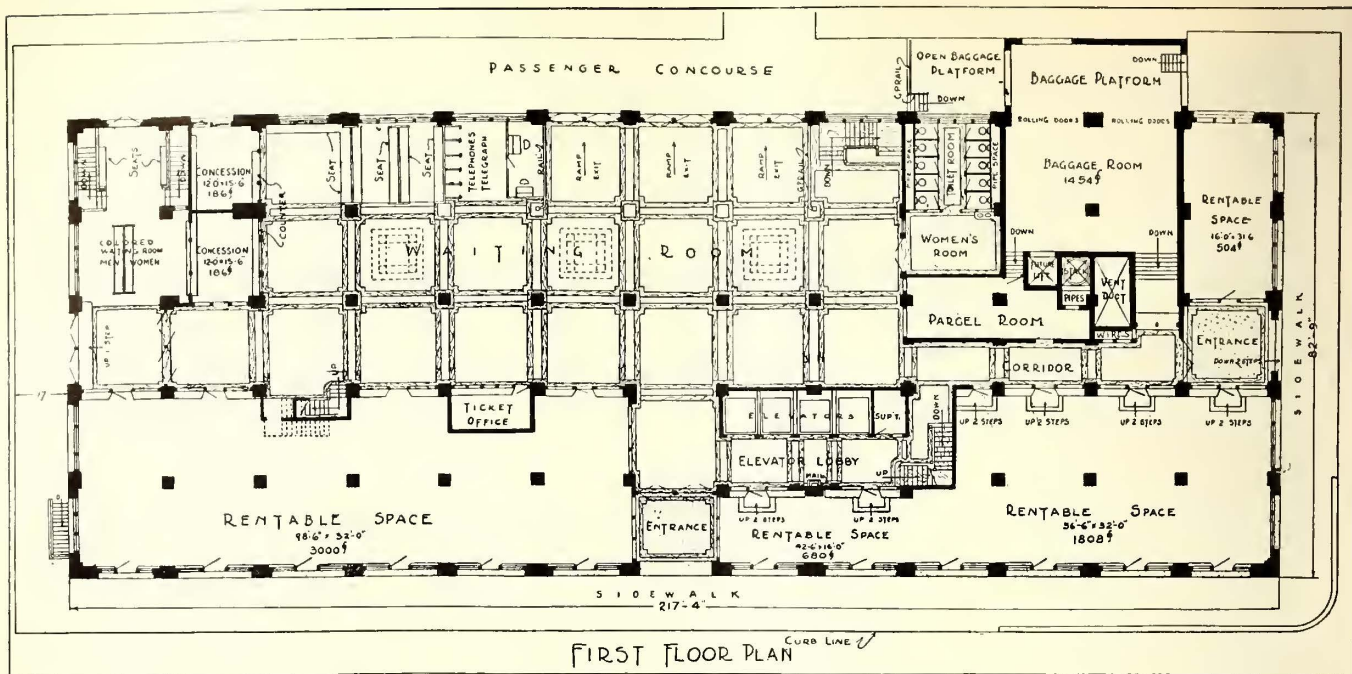
The accompanying map shows the location of the terminal and supplies, the terminal was finished and formally opened to the public on Sept. 1, four months ahead of the scheduled time. The rapidity with which the building was completed is considered remarkable under the circumstances, and the contractors have thereby established an enviable reputation throughout the Southwest. The accompanying map shows the location of the terminal

**CHARACTERISTICS OF THE
DALLAS TERMINAL**

The cost of land, building and tracks was \$1,500,000. The building has eight stories and basement and it is 83 ft. x 217 ft. in size. The area of the terminal site is 54,000 sq. ft., and the areas of the waiting, baggage and parcel rooms are as follows: Waiting room, 6400 sq. ft.; baggage room, 1454 sq. ft.; parcel room, 326 sq. ft. There are seven through tracks, which have a capacity of twenty-four cars. Four interurban lines use the terminal, and these have a mileage totaling 265. Some 6,000,000 passengers are carried annually by the interurban lines.



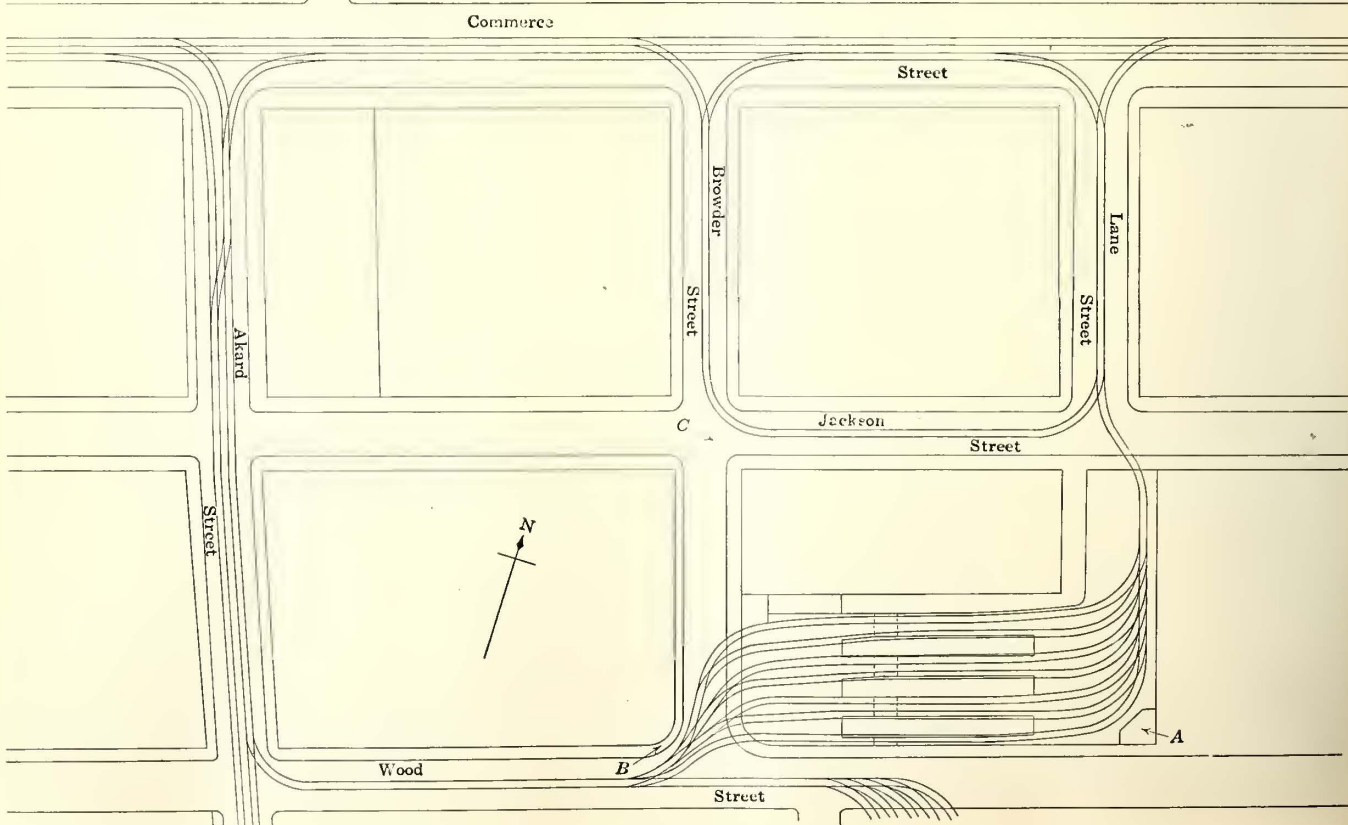
MAIN WAITING ROOM OF DALLAS INTERURBAN TERMINAL BUILDING



ARCHITECT'S PLAN OF MAIN FLOOR OF DALLAS INTERURBAN TERMINAL BUILDING

minal site, which is a tract of land fronting 284 ft. along Jackson Street east of Browder Street, 189 ft. on Browder Street south of Jackson Street, and 284 ft. on Wood Street east of Browder Street. Upon this site has been erected the eight-story terminal building, fronting 217 ft. on Jackson Street and 83 ft. on Browder Street. East of this main structure and to the south are to be found the network of special work and terminal tracks, while on the southwest corner of the tract is situated a two-story brick and concrete trainmen's house.

The terminal building is monolithic in type, with a reinforced frame, brick curtain walls and terra cotta trim. The architectural style is that of the late Italian Renaissance. Perhaps the most attractive feature of this handsome structure is the commodious waiting room, which is shown in one of the accompanying illustrations. The room is on the main floor, and has an area of 6400 sq. ft. It is well lighted by day through a row of windows along the south side, and by night it is indirectly illuminated through frosted bowls hung from the ceiling. Its terrazzo floors with Tennessee



TRACK LAYOUT OF DALLAS INTERURBAN TERMINAL SHOWING CONNECTIONS WITH TRACKS ON ADJOINING STREETS

gray marble borders, the refreshing combination of gray and green tile in the wainscoting, and the simple beam ceiling, with handsome lighting fixtures, present a most pleasing and harmonious appearance. The ventilation is provided by three motor-driven exhaust fans concealed above the ceiling of the room and by opening a row of windows on the south side.

WAITING ROOM CONVENIENCES

The ticket office, centrally located along the north side of the waiting room, was designed with the future development of traffic in mind. There are four windows, one for information, one for regular ticket sales, one for colored patrons, and an extra window for heavy business. Opening from the west end of the waiting room is the women's rest room, where a maid is constantly in attendance. Couches, comfortable chairs and reading matter make it a restful retreat. The baggage room, with an area of 1454 sq. ft., is situated in the southwest corner of the terminal building. The baggage and parcel checking window opens into the main waiting room. As the terminal is strictly a passenger station, all express matter will be handled at some location other than on the terminal property.

East of the main waiting room is a smaller but equally attractive waiting room for the negro patrons. In finish it is similar to the main waiting room, and like it is equipped with large comfortable oak settees. A drug store, the display room of the Dallas Electric Light & Power Company, a restaurant, barber shop, fruit store and newsstand will occupy the rentable area on the main floor, which faces on Jackson and Browder Streets and has auxiliary entrances from the waiting room.

Five passageways make the entrance to and exits from the waiting room simple. One of these is through the display room of the Dallas Electric Light & Power Company at the northwest corner of the building. Another is through a drug store facing on Jackson Street. The third is the main entrance itself on Jackson Street. The fourth is an entrance from Browder Street, and the fifth, which is used principally by colored patrons of the terminal, is on the east side of the building, facing an extension of Lane Street.

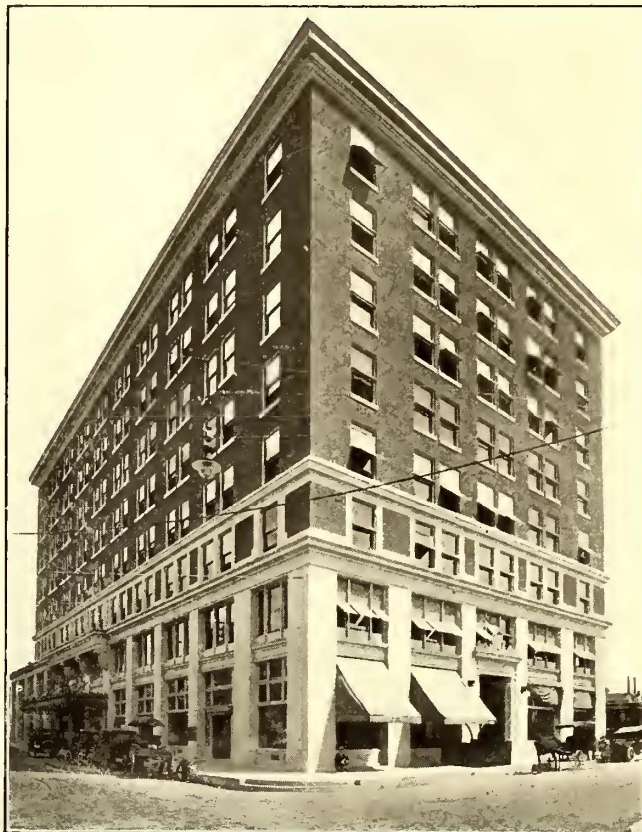
Besides using a large space on the main floor for a display room, the Dallas Electric Light & Power Company will have one of the substations and the meter and service departments of the company located in the basement, which was especially designed to accommodate the electrical apparatus. The floors above the waiting room are used exclusively for offices. The second floor is occupied by the general office of the street railway and lighting companies and by the local office of the Stone & Webster Engineering Corporation. The tenants on the other floors include the Southwest General Electric Company, the Texas Power & Light Company, the Texas Traction Company and the Southern Traction Company. Before the building was ready for occupancy over 90 per cent of the office space had been contracted for.

Admirably situated near the heart of the business district, the terminal is an average of 4.7 blocks distant from thirteen of the principal retail stores, six blocks from nine of the principal banks, 8.9 blocks from twenty-three of the principal wholesale houses, 4.7 blocks from nine of the principal theaters, 4.3 blocks from the sixteen other important office buildings, and 3.5 blocks from the largest six hotels.

One of the accompanying illustrations shows the location of the tracks in the terminal region. On leaving Commerce Street at Lane Street, all interurban cars operate over a single track to the terminal property, one block distant. Here the single track fans out into

seven through tracks, located south of the main building and parallel to it. Interurban cars on leaving the terminal run south on Browder Street to Wood Street, west on Wood Street to Akard Street, north on Akard Street to Commerce Street, and thence to their respective destinations. The seven tracks in the terminal have a combined capacity sufficient to accommodate twenty-four interurban cars of the largest type. Except for the seventh track, which is adjacent to Wood Street, the tracks are in pairs separated by concrete concourses. Concrete shelters protect the passengers on the concourses during inclement weather. The seventh track is provided with a pit, where emergency repairs can be made.

The plan is to have only emergency repairs made at the terminal. Across Wood Street and south of the



FRONT VIEW OF DALLAS INTERURBAN TERMINAL BUILDING TAKEN FROM POSITION C ON TRACK LAYOUT

terminal property is a tract 82 ft. x 151 ft. on which storage tracks are to be laid to accommodate about eighteen additional cars. All of the special work is of 127-lb. Lorain Steel Company section No. 397 rail. The connecting rails in the streets are 103-lb. Lorain Steel Company section No. 478, while the tracks on the terminal property and the storage tracks are of 80-lb. A.S.C.E. rail.

On the southwest corner of the terminal property a two-story brick and concrete trainmen's house has been erected. On the first floor of the building supplies for the car cleaners and repair men are kept. The upper floor is used for trainmen's quarters, and is provided with shower baths, lockers and game tables.

Beginning on Oct. 2, Dr. Samuel Sheldon will give, on Monday evenings, a series of thirty lectures and recitations on electric traction and transmission at the Brooklyn (N. Y.) Polytechnic Institute in connection with the evening technical courses.

How to Use Sinking Funds

Sinking Funds Not Set Aside So Much Now, But Under Existing Mortgages Providing for Them Perplexing Problems Arise—Author Describes Proper Accounting Treatment

By W. H. FORSE, JR., C. P. A.

Secretary-Treasurer Union Traction Company of Indiana, Anderson, Ind.

THE sinking fund requirement is a common-sense safeguard which is to be expected in cases where the security behind the mortgage is a diminishing quantity or one subject to violent fluctuation. For example, a bond issue put out by a manufacturing corporation may contain a sinking fund provision because of the more or less unstable character of the business. The process may be one which is subject to the white heat of competition, such as is found in the rapidly changing automobile industry, or it may be an undertaking that is liable to be revolutionized in a day by new scientific discoveries, inventions or tariff changes. In all of these cases adequate sums should be set aside to fund investment or debt as the oils, minerals, timber or other assets are sold, or when abnormal profits are being earned as the result of temporary extraordinary conditions.

SINKING FUNDS NOT NOW USED SO MUCH IN THE RAILWAY FIELD

When the electric railway industry was young, it was common to require sinking funds. The motive power had, within a comparatively short period, been changed from animal traction to underground cables, and then to the crude electric railway motors of a generation ago. Bankers naturally expected other revolutionary changes, and as a matter of precaution required that sinking funds be written into the early mortgages in order that the debt might be reduced before the dread specter of "obsolescence" appeared.

How different are the conditions in 1916! Electricity is operating cars over 40,000 miles of city streets and interurban railways in the United States alone, and conservative steam railway operators have adopted this form of energy for hauling heavy trains over the Rockies, for ridding great city terminals and tunnels of smoke, and for furnishing commuters with frequent, rapid suburban service. The electric railway industry has become so well established that it is now considered better practice to omit sinking fund requirements from mortgages unless there are peculiar local conditions, not common to the industry as a whole, which must be taken into consideration.

The sinking fund ordinarily used provides that sums must be set aside annually or at other periodical intervals to retire debt or investment. The modern electric railway in a growing community, however, can generally find better use for its surplus earnings in making the extensions and improvements demanded by the public and regulatory bodies. Improvements cannot always be financed out of earnings, and additional bonds must frequently be issued. In fact, the rapid growth of American cities has in the last decade required millions of dollars of increased capital to be invested in betterments and additions to existing electric railways. In the face of such facts, it would hardly be worth while for an electric railway to set aside \$100,000 to meet a sinking fund requirement for the retirement of bonds in one year, and in the same or following year issue \$200,000 worth of bonds to finance extensions and improvements to the railway property.

Moreover, bonds containing sinking fund provisions

are not attractive to the investor if the mortgage provides that they can be "called" by serial numbers, because the investor buying a long-term security does not care to face the possibility of being required to reinvest at a time when conditions may be unfavorable. Furthermore, if bonds retired through the sinking fund are to be purchased in open market, the company may be required to pay a premium and thus be penalized for retiring evidences of debt highly esteemed by the holders. This is a "tax" which is undesirable, to say the least.

SINKING-FUND PAYMENTS NOT CHARGES AGAINST CURRENT INCOME

Sinking funds are still found in the electric railway field, however, and the accountant is at times required to solve perplexing problems relating to them. There is considerable misapprehension concerning the proper treatment of sinking funds, and many business men otherwise well informed have the impression that they are properly chargeable against the income account. This opinion has prevailed in some quarters because it so frequently happens that sinking fund installments are paid out of gross income. The regularity of the payments and the fact that there is often no other source than current income for obtaining such moneys have resulted in an incorrect grouping, in some cases, of sinking fund payments with interest, taxes and other fixed charges. It is apparent, however, that sinking fund payments for retirement of funded debt or investment merely change the form of assets and liabilities and do not affect the income account.

Montgomery in his work entitled "Auditing—Theory and Practice" says: "Sinking fund requirements to retire bonds, etc., must not be confused with depreciation allowances," and "sinking fund installments are capital expenditures, and do not properly appear among operating expenses, but should be stated as deductions from net profits when ascertained." In the case of the Winnipeg (Man.) Hydro-Electric Company the by-laws and charter provided that the annual interest and sinking fund payments should be made out of the "revenues" of the utility, but Judge Robson of the Manitoba Public Utilities Commission called attention to the fact that the sinking fund payments constituted a repayment of capital investment and must be accounted for through capital account. Sinking funds, in short, are means for retiring capital obligations, and while mortgages may in some cases provide that the installments thereof shall be paid out of net income, it does not necessarily follow that the mortgagor must show by his accounts that such sinking funds have been charged against income.

The fictitious "Northern Interurban Railway," let it be supposed, has a property mortgaged for \$20,000,000, and an annual sinking fund requirement of \$100,000, to be used in retiring mortgage bonds. In 1916 its net income or surplus for the year amounts to but \$50,000 before making provision for the sinking fund. If it has \$2,000,000 cash in its treasury and applies \$1,000,000 of it to retire mortgage bonds under a provision

granting it that privilege, the \$1,000,000 would certainly not be charged against income or surplus account. Then why should the \$100,000 annual charge be considered a "deduction from income"?

To take another case. A newly incorporated company acquired the assets by outright purchase and assumed the obligations of several old public utilities. Among the obligations were two series of bonds which provided for sinking funds, whereby 2 per cent of the face value of bonds outstanding was to be deposited annually with the trustee of the mortgage. The new company was confronted with an obligation to meet the sinking fund requirements, with no surplus to draw upon. The question of sinking fund payments had nothing whatever to do with income. In this case the company sold some of its property not required in operation as a public utility and not covered by the mortgage, instead of borrowing money to pay the sinking fund installments. When it assumed obligations of the companies which it acquired, and carried out the sinking fund requirements, the liabilities (in part funded debt) were reduced from time to time as the sinking fund money was utilized in retiring bonds.

The assets changed their form from time to time as property was converted into the cash used to retire the bonds, but these operations had nothing whatever to do with the income account or the (non-existent) surplus account of the newly incorporated company. If the company had borrowed instead of selling property, its balance sheet, after the transaction had been entirely completed, would have shown an increase in floating debt and a similar decrease in funded debt, it being assumed that a short-term loan had been negotiated for the purpose of retiring bonds in accordance with sinking fund provisions.

ACCOUNTING FOR SINKING FUND

The Interstate Commerce Commission profit and loss accounts for electric railways (issue of 1914) contain accounts providing for "appropriations of surplus" for sinking fund and other reserves, for investment in physical property and for dividends. The text of the Account No. 309, pertaining to appropriations of surplus to sinking fund and other reserves, provides that amounts charged to this account shall be concurrently credited to one of two balance sheet accounts which are mentioned. In order to trace the theory of the official system of accounting, a fictitious example of a railway mortgage will be used as an illustration.

The "Great Eastern Electric Railway" has a bond issue of \$20,000,000; interest is payable April 1 and Oct. 1 at the rate of 5 per cent per annum, and its mortgage provides for a sinking fund of 2 per cent per annum of the total bond issue. It is required that the bonds be kept alive and draw interest while in the sinking fund, the interest to accumulate and be used in retiring more bonds. There is a cash balance of \$230,000 in the hands of the trustee on Jan. 15, after the semi-annual sinking fund installment has been paid by the railway. The trustee buys \$205,000 of bonds at 95 and interest on Feb. 1, paying therefor the sum of \$198,166, which includes \$3,416 interest Oct. 1 to Feb. 1 on \$205,000 of bonds. The total amount of bonds redeemed through the sinking fund is \$1,205,000, including those last purchased. The company owns and operates its property, and the plan of accounting for the transactions is shown below.

The monthly accrual of bond interest deductible from income would be based upon the \$18,795,000 of bonds outside the sinking fund, the Interstate Commerce Commission having ruled that the account "interest on funded debts" shall not include charges for interest on

funded debt obligations issued or assumed by the accounting company and owned by it, whether held in its treasury, in sinking or other reserve funds, or pledged as collateral. The commission apparently takes the stand that bonds in the sinking fund are "owned" or "controlled" by the corporation, a ruling to which some accountants object.

The interest, amounting to \$3,416, paid by the trustee as part of the purchase price of \$205,000 of bonds, presents a peculiar but simple problem. It is not known in advance that the purchase will be made at the time and for the amount stated, but the interest on these bonds will properly be included in the monthly accruals deducted from income from October to February, or until they are taken into the sinking fund. From that time forward the interest on these bonds is excluded from the deduction-from-income or so-called fixed-charge accounts.

The interest on bonds kept alive in the sinking fund, drawing interest which accrues to the benefit of the sinking fund, has nothing whatever to do with the income or annual net profits of the corporation. This interest, added to the fixed installments withdrawn from the business for sinking fund purposes, is used for reducing the bonded indebtedness of the company. The money may be taken out of gross receipts, or it may be obtained by selling property no longer needed. The transaction is merely a method of changing the assets and liabilities, for the asset cash is reduced and the indebtedness represented by bonds in public hands is likewise reduced.

The railway accountant desires to set up monthly accruals of the sinking fund in order to segregate this item from the so-called "free" surplus. It may be found necessary later on to use a large part of the surplus for property betterments or some unexpected thing, such as floods or financial stress, and the surplus is not "free" in the sense that it is available for dividends to stockholders. Nevertheless, the accountant accrues each month one-twelfth of the annual charge and concurrently credits the balance sheet account "sinking fund reserves," thus carrying out the wishes of the directors of his company that the recurring liability be shown in the accounts.

SINKING FUND VERSUS SINKING FUND RESERVE

There is considerable difference between a sinking fund and a sinking fund reserve, although each title is sometimes loosely applied to the other. Much of the confusion is probably caused by the fact that the term "reserve" is used in connection with banking and insurance in an entirely different sense from that in general accounting practice. Bankers consider a reserve analogous to cash or an equivalent of cash, but in accounting phraseology "cash" and "reserve" are not synonymous. A sinking fund in the strict sense is a "fund raised by annual contributions for the purpose of providing means for paying off a funded debt" (Hatfield). A fund may be defined as "a stock or accumulation of assets, either money or convertible wealth, brought together for a particular purpose" (Pace). On the other hand, a sinking fund reserve may be defined as simply a bookkeeping title of an account.

The fund is tangible, being money or other assets ear-marked for a special use, while the reserve is a term used in accounting for indicating certain desires or policies. An entry may be made opening up a reserve account to which sums are credited monthly, for the purpose of indicating an accruing liability, but the establishment of this account does not mean that funds are in bank to meet the obligation. There is no assurance or guaranty that a reserve will be used for the

indicated purpose, but a fund given to a trustee for a specific purpose or deposited in the bank to meet a certain contingency is a tangible asset to meet a fixed obligation and is generally so used. When the purpose for which a sinking fund reserve account was created has been actually carried out, the account itself disappears by cross entries unless it is retained as an open record and perpetual reminder of the disposition that has been made of a portion of the book surplus.

DISCOUNTS, PREMIUMS AND RENTALS

When \$205,000 "Great Eastern Electric Railway" bonds are purchased at 95, there is a discount or saving of \$10,250 which must be disposed of in the accounts. This is not "income," in the sense that income is ordinarily considered, but it is a credit to the profit and loss account. Without considering here the price at which the securities may have been originally sold, it may be said that they are re-acquired at a price which extinguishes \$100 of funded debt for \$95 in cash. The net worth of the corporation, which has carried its bond liability on the books at face value, is increased by the amount of the discount, and the book surplus is written up accordingly. If acquired at a premium the book surplus would be correspondingly reduced.

The remarks regarding the "Great Eastern Electric Railway," as before stated, are based upon the supposition that it owns and also operates its railway property. In case the company should lease its property to the "Consolidated Eastern Railway," which agreed to pay the lessor's sinking fund installments as part of the rental, receiving no credit therefor except as rental, the method of accounting would be considerably changed. The "Consolidated Eastern Railway" accounts would in such a case treat the sinking fund payments as a fixed charge, or deduction from income, the account being "rent for leased roads" in the Interstate Commerce Commission classification of accounts. There are not many leases which treat sinking funds in this manner, it being generally considered more equitable that sinking fund payments made by a lessee on account of a provision in the mortgage of the lessor be accounted for not as rental but as a reduction of funded indebtedness for which the lessee is entitled to compensation or relief.

Builds Line in Record Time

The Missoula (Mont.) Electric Street Railway, which is owned by former United States Senator W. A. Clark, has established a record for laying a line. On Aug. 10 the Great Western Sugar Company announced that it would build a \$1,000,000 sugar factory at Missoula on a site 1.6 miles from the city limits. Officials of the company conferred with Senator Clark regarding an extension of the railway to the site of the new plant. H. L. Bickenbaugh, superintendent of the local railway, was informed by Senator Clark that the line would be in operation within a month. Rails, trolley wire, ties, and poles had to be purchased, and a considerable amount of grading done.

A crew of men was put to work the day after the building of the line had been authorized. Before Sept. 10 the track was laid, the trolley wires strung, the feeders were installed and the Great Western Sugar Company was requested to give orders as to when it desired its factory material moved over the new line. The construction cost about \$13,000 a mile. Freight service is maintained on the line in Missoula, but it is estimated that the freight business will be increased 60 per cent by the coming of the sugar factory to that city.

Trolley Guide to Washington, D. C.

Co-operation of Electric Railways Has Resulted in the Publication of an Attractive Folder

AN excellent example of co-operation in publicity work is furnished by the getting together of the Washington Railways & Electric Company and the Capital Traction Company of Washington, D. C., in the publication of a folder of unusual intrinsic value. When opened out, the folder becomes a sheet 18 in. x 24 in. in size, on one side of which is a remarkable bird's-eye view of the city of Washington in colors, the work of H. H. Green. When folded, it is 4 in. x 9 in. in size, the two sides being attractively decorated, as shown in the accompanying halftone. A quarter of one side of the open sheet is taken up with a map of the city, on which the electric railway lines are shown in red. Where the lines extend beyond the field of the map, the points reached by them are indicated and the distances to these points are given. The map is provided with



COVERS OF THE NEW WASHINGTON (D. C.) TROLLEY TRIP FOLDER

marginal scales and an index accompanies it so that the public buildings and other points of interest can readily be located. The remaining space in the folder is filled with brief descriptions of the most important buildings and other sights of the city, several illustrated with halftone engravings.

The purpose of this folder is to impress upon travelers the attractiveness of their national capital and to facilitate their visit to the points of interest by means of the electric railways while they are in the city. The folder was prepared by the Matthews-Northrup Works, Buffalo, N. Y. It is planned to distribute it so that as far as possible travelers who are including Washington in their tours will be provided with copies before they arrive there.

Negotiations are about to be concluded by the Government of Uruguay for the purchase of the commercial electric tramway system of Montevideo, which includes the following lines: Union and Maroñas, Buceo and Union, Este and Reducto, and Sayago and Colon, and other properties valued at approximately \$16,000,000.

United Railways Power Situation

The St. Louis Traction Company in a Special Report to Its Stockholders Gives Power History, Present Outlook and Comparative Costs

IN the financial and corporate department of this week's issue there appears an analysis of the financial part of a special semi-annual report issued to stockholders of the United Railways of St. Louis for the first six months of 1916. Besides such financial data, however, the report contains matter on other subjects deemed by the management to be of interest to stockholders. Among these subjects is the power situation of the company, concerning which the company's position is as shown in the following abstract of the power section of the report.

At the present time power for the operation of the United Railways of St. Louis is obtained from (1) Water power purchased; (2) Union Electric power purchased, and (3) power produced in the plants of the United Railways. The plants of the United railway are run chiefly as peak plants at a load nearly up to their capacity and at other times are maintained as a reserve against any emergency which might require their use.

For the first six months of 1916 power statistics of the company are as follows:

Average distribution of power on kilowatt-hour basis:	
Electric Company of Missouri (water power).....	58.1 per cent
Union Electric Light & Power Company.....	31.6 per cent
United Railways plants.....	10.3 per cent
Distribution of peak load:	
Electric Company of Missouri (water power).....	40.8 per cent
Union Electric Light & Power Company.....	27.0 per cent
United Railways plants.....	32.2 per cent
Total kilowatt hours during first six months of 1916.....	92,217,593
Average week day peak.....	54,000 kw.
Average daily load factor.....	40.3 per cent
Cost of water power per kilowatt hour.....	0.577c
Cost of Union Electric power per kilowatt hour.....	0.836c
Cost of all purchased power per kilowatt hour.....	0.669c
Cost of generated power (operation and maintenance only) per kilowatt hour.....	0.924c
Average cost of all power per kilowatt hour.....	0.695c

WATER POWER PURCHASED

The special report to stockholders contains a resumé of the power history of the United Railways since its organization in 1899. To pass over the earlier details, it appears that after the World's Fair in 1904, the business of the United Railways grew rapidly until the financial depression of 1907 and 1908. Conservative estimates as to the power requirements contemplated an increase in demand of at least 10 per cent per year. In 1907 and 1908 negotiations were under way for the sale of water power from Keokuk in St. Louis. The United Railways was not financially able to build an economical power plant of its own, and the price of \$25 per horsepower year, which at 60 per cent load factor amounts to about 0.625 cents per kilowatt hour, was attractive because it was lower than steam power was costing at that time, and there was no indication that the economy of steam power plants would ever be greatly improved. The water power was also attractive on account of the small number of men required to furnish and distribute it, as that seemed to offer immunity from the danger of the source of power being tied up by strikes.

On Oct. 26, 1908, therefore, the United Railways contracted for 27,500 hp. of water power with the right to use 30,000 hp. on peak. If this privilege is taken into account, the price per horsepower year is \$22.92 instead of \$25. On account of changes in the voltage

and point of delivery, the contract price has been reduced \$68,750 per year. This reduction is effective Jan. 1, 1916, and reduces the price per horsepower year to \$22.50 or \$20.62 if the peak is taken into account, and the price per kilowatt hour to 0.577 cents instead of 0.625 cents.

The period of the contract is for ninety-nine years divided into eleven consecutive periods, of which the first period is five years from the initial service date, the next nine periods ten years each and the last period four years. At the end of the first five-year period of service and at the end of each succeeding ten-year period of service there shall be an adjustment made in the price of \$687,500 per year, depending upon the price of standard Illinois mine run coal during the last two years of any such period. For each cent that the average price of such mine run coal exceeds the sum of \$1.42 per ton the price for service shall be increased one-half of 1 per cent. There is a corresponding reduction in price in case the price of mine run coal is less than \$1.42 per ton.

Delivery of power under this contract began July, 1913. The Electric Company of Missouri, which is the successor of the Mississippi River Power Distributing Company, built a transformer station on Page Avenue just west of the city limits. At this transformer station power transmitted from Keokuk at 100,000 volts is transformed to 13,200 volts, at which voltage it is delivered to the United Railways.

UNION ELECTRIC POWER PURCHASED

Under the terms of the water power contract of 1908, the latest date for delivery of water power was February, 1914. After the contract had been made there was so much delay in financing the water power project that it seemed delivery would not be made before that date, if it was made at all. It was necessary to have additional power for the increasing load of the company for 1910, and as at that time delivery of water power was doubtful, a ten years' contract for additional power was made with the Union Electric Light & Power Company to take effect Jan. 1, 1910. This contract was on more favorable terms than the one in effect at that time, a modification of the first 1903 contract made in 1906 and extending until Aug. 1, 1914.

The amount of power to be delivered under this new contract was as follows: 1910, 6000 kw.; 1911, 9000 kw.; 1912, 12,000 kw.; 1913, 15,000 kw.; 1914, 10,000 kw., Jan. 1 to Aug. 1; 1914, 20,000 kw., Aug. 1 to Dec. 31; 1915, 15,000 kw.; 1916, 15,000 kw.; 1917, 12,000 kw.; 1918, 10,000 kw., and 1919, 5000 kw. The contract specifies during each year the number of kilowatt hours for which the railway company agrees to pay during each calendar month. This number of kilowatt hours is based upon a 45 per cent load factor.

The price which the company pays for this power is as follows: (a) A fixed charge of \$15 per annum per kilowatt (\$1.25 per month). (b) An operating charge of 0.45 cents per kilowatt hour. (c) Any special tax that the producer might be required to pay in connection with this contract. The cost of power taken under this contract has averaged about 0.835 cents per kilowatt hour.

When the United Railways was organized in 1889, it inherited from the constituent companies seven electric plants and a number of cable plants. The electric plants were all small in size, of antiquated design, unreliable in operation, expensive to run and poorly located. In 1907 when the Suburban System was taken over, another electric generating plant was inherited.

In 1900 the St. Louis Transit Company rebuilt the plant at Park and Vandeventer Avenues which formerly belonged to the Lindell Railway, and installed therein 12,000 kw. of direct-current machinery, the largest unit being 2250 kw. This machinery was what was considered modern at that time. The plant not being located upon water, it was necessary to use city water for condensing purposes, and cooling towers were installed so that the condensing water could be used over and over again. A new plant of 6900 kw. capacity was also built in 1900 at Broadway and Salisbury Street. Of this capacity 4500 kw. was direct current and 2400 kw. alternating current. This plant also was not located upon water and it was necessary to use cooling towers in connection with the condensing system.

The plants of the company built in 1900 have become antiquated on account of the great improvements in the design of steam machinery since that time. Operated at their full capacity, they could not supply one-third of the present demand for power. Under the most favorable conditions their efficiency has never exceeded 0.60 cents per kilowatt hour for operation and maintenance alone, neglecting interest on investment, depreciation, obsolescence and all fixed charges. A proper allowance for these fixed charges would be about 0.5 cents per kilowatt hour. This would make a proper charge for generated power as compared with purchased power of more than 1 cent per kilowatt hour if the plants were always operated under the most favorable conditions.

COMPARISON OF GENERATED AND PURCHASED POWER

It would be interesting, the stockholders are told in the special report, to estimate what the cost of generated power would have been if the United Railways had carried out its original intention in 1903 of building a new power plant and had started by installing the machinery purchased at that time. To explain this point, it may be said that the growth of the company's business had been very rapid after the consolidation, and in order to take care of the anticipated business during the World's Fair in 1904 it was deemed necessary for the company to have additional power. In 1903 the St. Louis Transit Company decided to put up a power plant and contracted for 16,000 hp. of Stirling boilers and 14,000 kw. capacity of turbine generators for installation in this new plant. After contracts for the purchase of this machinery had been made, it was determined that the St. Louis Transit Company could not make financial arrangements to procure the money to build this power plant, or even to pay for the machinery under contract. In order to relieve the company from this embarrassing situation and insure power for the future operation of the road, especially during the World's Fair period, the first contract was made with the Union Electric Light & Power Company on June 26, 1903, under the terms of which that company took over the machinery which the St. Louis Transit Company had ordered and agreed to furnish power under certain conditions.

The United Railways is now purchasing about 37,000 kw. of power, so that the original installation just described would have constituted about one-third of the plant necessary to supply the power now purchased. The economy of steam apparatus in 1903 was low and

the cost per kilowatt was high as compared with similar machinery at the present time. If the plan of building a power plant in 1903 had been carried out, it would have been necessary to add to this plant from time to time, and the plant at present would consist of 45,000 or 50,000 kw. of machinery representing all the stages of the art between 1903 and 1916. Although the machinery purchased within the last few years would be efficient, the machinery in the primary installation and that installed during the first half of this period would not show such economy.

Taking all these factors into consideration, and using as a basis the operating costs of the large Ashley Street plant of the Union Electric Light & Power Company during this period, the report states that a conservative estimate of the present cost per kilowatt hour of power produced by this hypothetical plant would be about 0.80 cents. This should be compared with the costs of purchased power during the first six months of 1916 as follows: Cost of purchased water power, 0.577 cent; cost of purchased steam power, 0.836 cent, and average cost of all purchased power, 0.669 cent.

If a new steam plant of about 45,000 kw. capacity were built at the present time in a desirable location on the river, equipped with the most modern machinery, it would involve an expenditure, including transmission lines, of not less than \$3,500,000. From such a plant operating on a railway load, an economy of 0.6 cents per kilowatt hour could be expected. It is evident, however, the report states, that up to the present time it has been to the marked financial advantage of the United Railways to have purchased power rather than to have attempted the financing of its own generating plants.

FUTURE POWER REQUIREMENTS

At the present time the peak of the load is about 55,000 kw. A conservative estimate of the power required next year is 6 per cent in excess of this peak, or a maximum of 58,500 kw. The capacity of one of the railway plants is now being increased 1200 kw. by certain changes. Under the terms of the contract the power received from the Union Electric Light & Power Company decreases 3000 kw. on Jan. 1, 1917.

The situation is now as follows:

1916 Operation	
Peak	55,000 kw.
Water power supplied under contract	22,400 kw.
Steam power supplied under contract	15,000 kw.
Capacity of railway plants	20,400 kw.
Reserve capacity	2,800 kw.
1917 Operation	
Peak	58,500 kw.
Water power supplied under contract	22,400 kw.
Steam power supplied under contract	12,000 kw.
Capacity of railway plants	21,600 kw.
Deficit	2,500 kw.

The contract with the Union Electric Light & Power Company for steam power, which in 1916 calls for 15,000 kw., expires at the end of the year 1919. By that time it is conservatively estimated that the gradual increase in service will cause an increase in load of 10,000 kw. This amount, when added to the amount of power now being purchased from the Union company, calls for facilities available in 1919 having 25,000 kw. capacity. A power plant to furnish 25,000 kw. at all times should have at least 35,000 kw. capacity. The report concludes, therefore, that the United Railways is confronted with these alternatives: (1) The beginning in the near future of the construction of a new power plant with an original installation of 35,000 kw. of machinery requiring the expenditure of a large sum of money. (2) A new contract with a power company for a gradually increasing supply of power as needed.

Pneumatic Machines Reduce Tamping Gangs from Six to Two

The Experience of a Number of Electric Railways and Actual Test Data Show Excellent Results in Reduction of Labor Cost and Indicate Increased Stability of Track and Roadbed

By H. L. HICKS

Ingersoll-Rand Company, New York

THE development of the pneumatic tie tamper was the natural outgrowth of a demand for a mechanical device that would reduce the cost of ballasting track. The pneumatic tamper has now been in use for about a year and a half on electric railway work, and from the results obtained it is safe to say that this type of machine has come to stay. Its use is already widespread and it is not idle fancy that warrants the prediction that the pneumatic tie tamper will in the course of time practically supersede all hand tamping.

The pneumatic tie tamper, as its name signifies, operates on compressed air. It is a percussive tool similar in action to the pneumatic riveting hammer. The tamper (Fig. 1) consists of a barrel section, containing a free moving piston, a suitable extended handle with grips for holding it and a tamping bar. The last is inserted in the end of the barrel and is loosely held in place by a retainer fitting over a collar on the tamping bar itself. The piston reciprocates rapidly and delivers a succession of blows on the upper end of the tamping bar which in turn transmits the impact to the ballast.

Pneumatic tie tampers are operated in pairs (Fig. 2), one tamper on each side of a tie. Their weight, 37½ lb. each, is sufficient to feed the tools down as the ballast is forced under the tie. All that is required of the operators is to hold and guide the machines. The tamping bars rest on the ballast and force it down and under the tie. In starting, these tampers are held vertical with the broad faces of the tamping bars parallel

PNEUMATIC TIE TAMPING—FIG. 1—TYPICAL TAMPING MACHINE

with the tie. This position is maintained until the bottom of the tie is reached when they are swung outward until at the proper angle to force the ballast under the center of the tie.

In the operation of the pneumatic tamper the tamping bar is practically stationary, transmitting to the ballast the rapid blows received from the piston. The absence of reciprocating motion makes the guidance of the machine an easy matter. The operator is able to avoid striking and injuring the ties and can guide the tamping bar in between switch points, cross-overs and similar places where he could not swing a pick or wield a tamping bar. It has also been a matter of observation that the pneumatic tamper does not crush the ballasting material.

The pneumatic tamper operates most efficiently on air at 65 lb. to 75 lb. pressure. In terminal yards and on systems where electro-pneumatic signals are used it has been found both convenient and entirely practical to use air from the signal service line, as the small amount used does not impair the operation of the signals. In ordinary traction work air is supplied from a portable compressor, usually electric driven. The customary provision of 300 ft. of hose gives a large working radius without moving the compressor.

While the pneumatic tie tamper works in any kind of ballast it is advisable to change the dimensions of the tamping bar face to suit the size of ballast and thus secure maximum effect from the available power. In



PNEUMATIC TIE TAMPING—FIG. 2—A WORKING UNIT. TWO MEN WITH TAMPERS AND ONE MAN SHOVELING BALLAST

crushed stone, 2 in. or over in size, a bar with a face 3 in. x 5/8 in. gives best satisfaction; with smaller stone or gravel a tamping face 3 in. x 7/8 in. is most effective and in tamping sand, dirt or cinders a still larger face, 3 in. x 1 1/8 in. secures the greatest efficiency.

It is interesting to note the experiences of several electric railways with the pneumatic tamping machines.

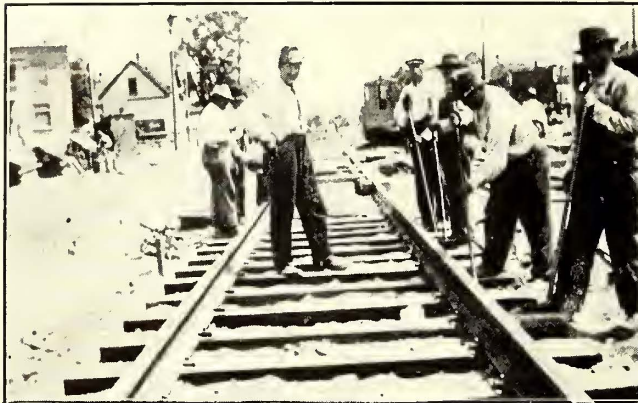
The Public Service Railway of New Jersey in extending its trackage in East Orange started tamping with two pneumatic tampers operated from a portable compressor (Fig. 3). The average day's work of three men, two tampers and a shoveler, was sixty ties tamped on both sides for their whole length. Two-inch stone ballast was used and the track lifted 6 in. The foreman's comment to the writer was that ten men hand tamping might beat the two machines but six men could not keep up with them. To expedite still further



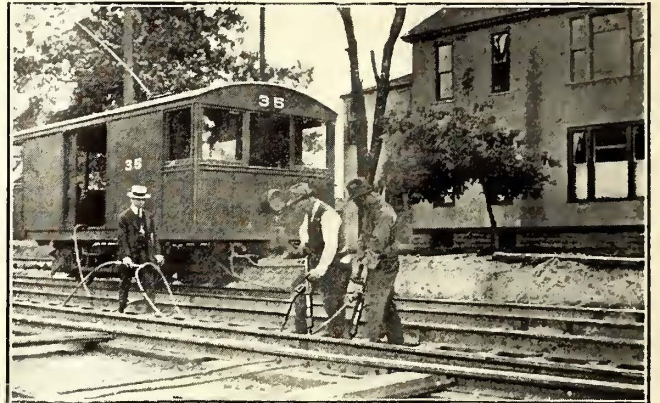
Pneumatic Tie Tamping—Fig. 3—Six Machines in Use on Double Track Extension in East Orange, N. J.



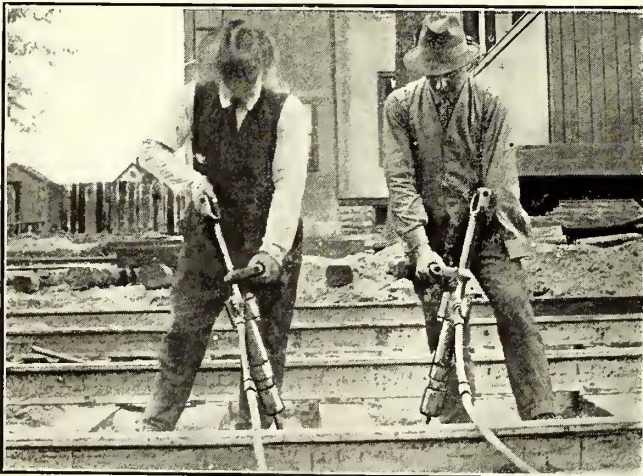
Pneumatic Tie Tamping—Fig. 4—Standard Compressor-Car, Public Service Railway, New Jersey



Pneumatic Tie Tamping—Figs. 5 and 6—Tamping Sand and Gravel Ballast, Twin City Traction Lines, Minneapolis, Minn.—Six Men Hand-Tamping Replaced by Two Men with Machines



Pneumatic Tie Tamping—Fig. 8—Tamping Stone Ballast on Dual System of Rapid Transit in Queens Borough, New York City



Pneumatic Tie Tamping—Fig. 7—One-Armed Man Operating Tamper, Twin City Traction Lines

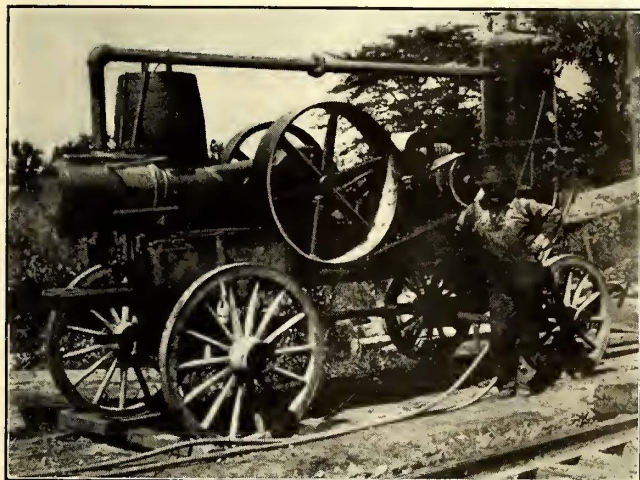


Pneumatic Tie Tamping—Figs. 9 and 10—Tamping Dirt-Gravel Ballast, on Lines of Indianapolis Traction & Terminal Company—Six Men with Shovels Replaced by Two Men with Machines



the construction work an additional double unit of two pairs of tampers, operated from a similar compressor of large size, was placed in operation (Fig. 4).

At Minneapolis the Twin City Rapid Transit Company prepares the roadbed for new track by grading with a steam shovel, dumping in stone ballast and rolling it smooth with a steam roller. A layer of gravel is then added, the ties and track are laid and sand gravel ballast dumped in for tamping. Observations show that on this work two men (Fig. 6) with pneumatic tampers do the work of eight men (Fig. 5) who formerly did tamping by hand. The average time required to tamp the full length of a tie on both sides is one and one-quarter minutes. When the operators noticed that their work was being timed they made a record of three-quarters of a minute. One of the most striking features of the work done here was a demonstration (Fig. 7) that a tamper could be operated by a one-armed man. The discovery was gratifying, not only to the individual but to the company on which he was dependent.



PNEUMATIC TIE TAMPING—FIG. 11—COMPRESSOR FOR ROAD TRANSPORTATION IN ADVANCE OF TRACK LAYING

Thomas Crimmins & Sons, contractors for the laying and ballasting of the track on the concrete viaduct of the rapid transit system extension in Queens Borough, New York City, used four pneumatic tampers operated from a gasoline driven compressor (Fig. 8). The conditions here were rather unusual. The concrete structure had been filled between the sidewalls with 3-in. crushed stone, the depth varying from 5 to 10 ft. This was covered with a 3-in. layer of 2-in. stone, the track then laid and 2-in. stone ballast of an average depth of 12 in. dumped on for tamping. This construction necessitated very thorough work on the part of the tamping machines, to secure a permanently stable roadbed. An average of 550 ft. of track or about 367 ties per day were pneumatically tamped by a gang consisting of four men operating the tampers, two men shoveling ballast and four jacking up and aligning track.

On one of the lines of the Indianapolis Traction & Terminal Company, Indianapolis, Ind., the failure of continuous welded track due to excessive warping made relaying necessary. After employing six men shovel-tamping the dirt gravel ballast two pneumatic tampers (Fig. 10) were tried out and found to do more work than the hand labor, which they replaced (Fig. 9). While the time record of their performance was variable due to the necessary delays in replacing the warped rails, their efficiency of operation was very satisfying to the company. For supplying compressed air to the tampers a standard straight line Ingersoll-Rogler com-

pressor was mounted on a heavy construction wagon together with a short-belted electric motor and air receiver (Fig. 11).

Investigation of results seems to justify the claims that machine tamped track is of greater stability and permanence than hand tamped track. Unfortunately no test data are available on electric railway work. The results obtained by the New York Central may be of interest as an indication of the quality of the work done by this type of machine. As a test 800 ft. of track was machine tamped and a similar length hand tamped. At the end of six months the comparative stability was measured with the following results:

Greatest Settlement		Least Settlement		Average Settlement	
Hand	Machine	Hand	Machine	Hand	Machine
0.116 ft.	0.063 ft.	0.018 ft.	0.004 ft.	0.067 ft.	0.033 ft.

This experiment was conducted on track over the Hackensack Meadows, New Jersey, where the foundation was soft, and for that reason not the ideal place for the purpose. The comparative results observed have been unofficially verified in electric railway work but exact figures have not been compiled.

How European Roads Deal with Strikes

Mr. Fox Says That Unionism Undermines Discipline and Cites Examples from Abroad of Attitude of Municipalities in Such Cases

IN a letter to the *New York Times* of Sept. 18, John P. Fox, transportation expert, discusses the subject of strikes on electric railways in this country and abroad. Among other things he says:

"It seems to one who has impartially investigated the results of transit strikes in other cities that the public has almost always been the chief sufferer in the end. Higher wages have been followed by inferior service, while unionism has undermined discipline at the expense of safety and the proper treatment of passengers by employees. No one will question the fact that unions have their place, and that strikes are necessary in certain trades, nor the possibility that transit workers may need better conditions and higher wages on some of the lines in New York. But, whether the railway companies are right or wrong in the present instance, the victory of the Amalgamated seems sure to be an injury to the public. Unionism has been carried so far on transit systems in this country that the people must now step in and insist on the consideration of their rights.

"The strongest arguments against the interference of the unions with public transportation are to be found in the experience of British cities. On no transit lines are the workers better treated than on the municipally owned and operated systems of England, with their nine-hour day, six days a week, free uniforms, a week's vacation every year with pay, pensions, bonuses for safety, and frequent increases of wages. And yet these model transit systems, which are generally charged with paternalism, in order to maintain discipline and give adequate service to the public, have found the unions a menace, and have on more than one occasion fought them with every weapon used by the New York companies, such as refusing union recognition, locking out men, employing strikebreakers and even prominent citizens to maintain service, declining arbitration, refusing to reinstate strike leaders, and taking men back only on signing individual contracts.

"The stories of the English tramway strikes read

surprisingly like the New York strike up to the present time, and it is to be hoped that this one will end in the same way, with the subordination of unionism and unreasonable demands to the interests of the public.

"On the Halifax municipal system in 1906 the men struck to compel the reinstatement of a motorman who had caused a fatal accident resulting in the loss of two lives and injuries to other passengers. The city employed strikebreakers, gradually replacing them with local men, refused arbitration on the ground that it could not discharge new men, and took back only a small number of the strikers who were sufficiently penitent and could be given work.

"The English railroad strike of 1911 was coincident with a widespread condition of unrest on the tramway systems, and caused several inconsidered strikes in the large cities. While the municipal managers at times conceded something to the men in order to stop the epidemic of strike fever, the public interests were kept foremost, only reasonable concessions being made; while in some cities the unions were handled without gloves. In Leeds, the men started to strike without notice or any good cause, in spite of the plea of the mayor for a day's delay to initiate arbitration. They were promptly locked out by the manager, obliged to accept the very terms they had rejected, and sign a three years' agreement.

"In Glasgow, where one might expect the unions to have the greatest hold, the sternest measures of all were applied. Concessions had just been made to the men before they went out, so that little consideration was shown them. The municipal manager was given absolute power to handle the strike. Arbitration was refused because it carried with it reinstatement of all the men, and it was decided to retain all new men and never to let certain strikers return. In this case the city itself broke up the union because of its interference with a public service.

In Liverpool, more leniency was shown in taking back the strikers, because they admitted they had been misled, and promised never to strike again. When the men suddenly left their posts in the municipal power house, threatening the city's lighting supply as well as current for the cars, prominent young men took the places of the strikers, and kept the fires, engines, and dynamos going day and night. When the strike was over these volunteer citizens formed a permanent body to respond in future emergencies. Public money as well as private funds were given to the municipal employees who were loyal during the strike.

"While the New York transit lines are not operated by the city, many of them are owned by it, and no city in the world is so dependent on transit as New York is. Unionism has twice interrupted the service, and if the English municipal systems were justified in taking extreme measures to serve the public, are not the New York companies all the more justified, and should not the authorities support them to the end in preventing further interruptions? If the strikers were misled and are penitent, let them be taken back as individuals, but under conditions which will make them remember that they deserted positions of public trust.

"The transit systems of New York and the character of their employees have been steadily improving in recent years. To give in to the union now would demoralize discipline and endanger all the progress in the treatment of the public on the cars. It is greatly to be hoped that the strikers will see their mistake and avoid further conflict.

"To recognize the union would also mean a constant rise in wages without regard to the ability of companies to pay the increase. That is what is alarming

the companies in union cities. While freight rates can be raised on railroads, it is impossible to raise city fares. With the obligations of the dual system to face and a heavier cost of subway construction than ever expected, the City of New York is certainly interested in keeping down the operating expenses of the companies, unless taxes are to be burdened with future deficits."

Fire and Accident Prevention Day

THE National Fire Protection Association has cooperated with the National Safety Council in preparing for the celebration of a "Fire and Accident Prevention Day" on Oct. 9. In this they will have the assistance of the National Association of Credit Men, the Fire Marshals' Association of North America and the International & Dominion Association of Fire

FIRE AND ACCIDENT PREVENTION DAY


OCTOBER 9th

THE NATION'S FIRE TOLL

5000 DEATHS PER YEAR - - \$500 LOSS PER MINUTE
TWO THIRDS OF FIRES ARE PREVENTABLE

**10,000
PERSONS
WORKLESS**

**20,000
PERSONS
HOMELESS**




Aerial Photo of Salem, Mass. Fire

**CARELESS-
NESS
DID THIS
YOUR TOWN
MAY
BE NEXT**

THE NATION'S ACCIDENT TOLL

35,000 DEATHS PER YEAR - - 2,600,000 INJURIES PER YEAR
TWO THIRDS OF ACCIDENTS ARE PREVENTABLE

**STREET
ACCIDENTS
KILL
AND
CRIPPLE**



Street Photo by New Orleans

**THOUSANDS
OF CHILDREN
EACH YEAR.
YOUR CHILD
MAY BE NEXT**

STOP FIRES AND ACCIDENTS

IN YOUR TOWN, YOUR HOME, YOUR FAMILY.

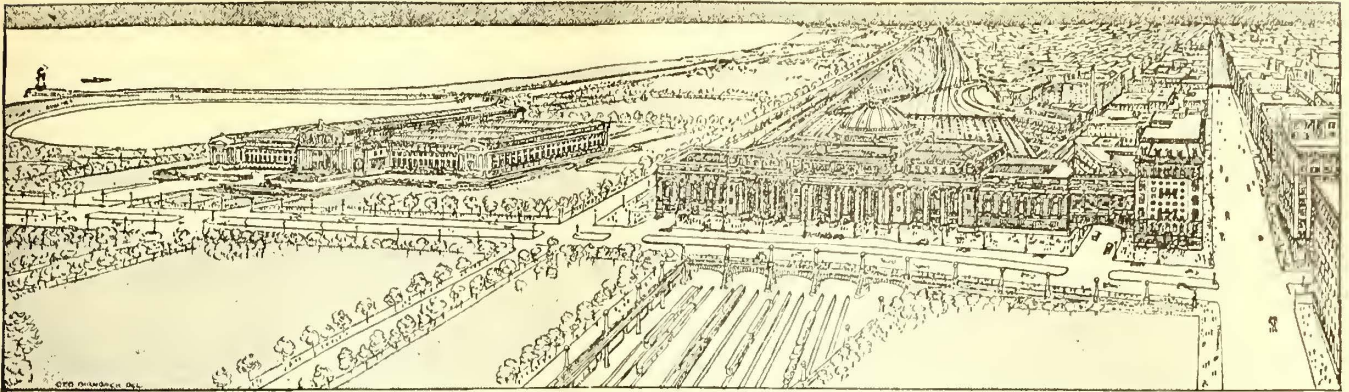
ONE DAY FOR HUMANITY

National Fire Protection Association, 87 Milk St., Boston.
National Safety Council, 208 S. La Salle St., Chicago, Ill.

POSTER USED IN ADVERTISING FIRE AND ACCIDENT PREVENTION DAY

Chiefs. President Wilson and the state governors will issue proclamations and the trade organizations in every town of 10,000 inhabitants and over will be reached. The accompanying illustration is from a large poster, in colors, of which copies, accompanied by suggestion pamphlets, are being sent to all those who desire them. The pamphlet is designed to be helpful in planning the day's exercises.

A recent survey of the several thousand employees of the various companies included in the Illinois Trac-tion System shows that 1200 have been with the company more than five years, 400 more than ten years, seventy for a term of fifteen years, forty-three for twenty-five years, five for thirty-five years and two for forty-five years.



BIRD'S-EYE VIEW OF TERMINAL DEVELOPMENT PROPOSED BY ILLINOIS CENTRAL RAILROAD FOR CHICAGO LAKE FRONT

Illinois Central Proposes Three-Level Union Station for Chicago

The Illinois Central Railroad has submitted to the railroad terminal committee of the City Council plans for a new \$20,000,000 terminal to accommodate every railroad entering Chicago excepting those using the Northwestern and Union stations. A. S. Baldwin, chief engineer of the railroad, states that the complete development of this plan necessitates the electrification of suburban traffic.

In the proposed terminal station the tracks enter on three levels. The uppermost would contain twenty-four passenger tracks, the middle level would be devoted to freight and express traffic, while on the low level, to be reached by subway, suburban traffic would be handled.

The accompanying illustrations reproduced from the *Chicago Herald* of Sept. 21 are typical of the drawings submitted by Mr. Baldwin to the terminal commission on Wednesday of this week. They show a head house or station proper with a frontage of about 700 ft. and a depth of 250 ft. Its architecture is of Ionic style and it is designed to harmonize with the Field museum under construction to the east. In the bird's-eye view a hotel is shown located on the corner of Michigan Boulevard and Twelfth Street extended toward the east. A bridge across Indiana Avenue extended north to Grant Park connects the hotel with the station.

The plan calls for the separation of grades at Eighteenth Street, the long distance trains ascending and the suburban trains descending. It is also proposed to purchase a 200-ft. strip immediately north of Eighteenth Street extending to the south branch of the Chicago river, to intercept other lines which might contract

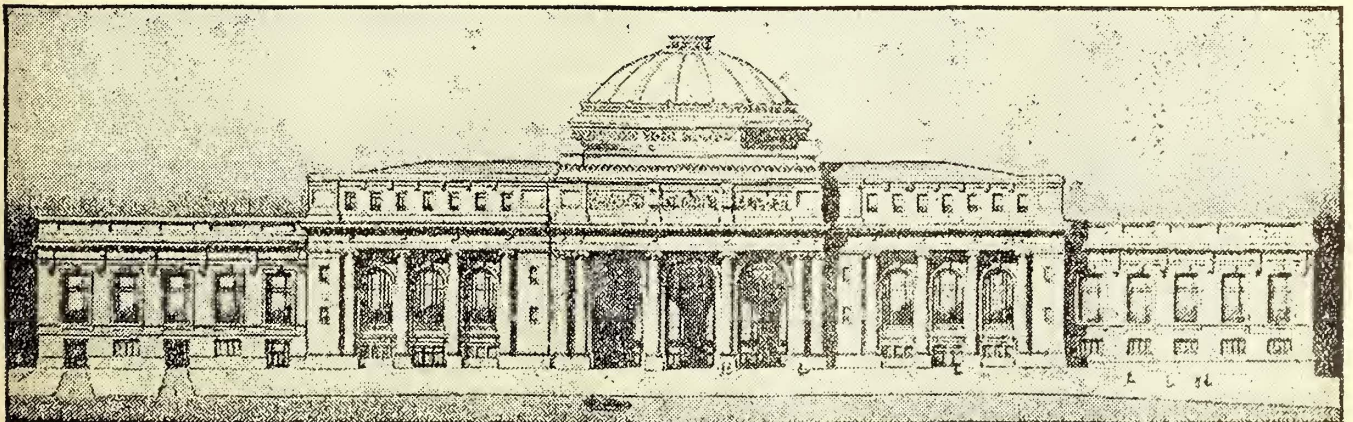
to use the terminal. There would be an entrance into the terminal yards at Eighteenth Street, a distance of about 3500 ft. from Twelfth Street. This connecting line would be brought to the yard at a considerable elevation.

It is also proposed to extend the Twelfth Street surface car line to the east boundary of the Illinois Central property, the tracks being depressed under Michigan Boulevard.

At present no agreements have been made with the other roads which would have to use the terminal to make it a complete success. There is also no definite proposition regarding electrification. While, as stated above, Mr. Baldwin considers the electrification of the suburban lines necessary for the complete development it is not necessary to a partial development as the lines can be brought in on the present level.

The committee showed interest in the plans presented but suggested a more tangible proposition which was promised within a month. In the meantime the other roads interested refuse to commit themselves as to their attitude in the matter.

The Court of Appeals at Vancouver, B. C., has decided that the liability for paying the damages in the Main Street runaway car case of September, 1914, in which the pranks of mischievous school boys resulted in a collision between runaway freight cars and a street car, with two deaths and numerous accidents, falls upon the British Columbia Electric Railway. The Appeal judges have relieved the Dominion Creosoting Company, which as the consignee of the freight cars was made a co-defendant in all the suits, from liability to pay damages.



FACADE OF PROPOSED LAKE FRONT RAILROAD TERMINAL FOR CHICAGO

1916 CONVENTION
ATLANTIC CITY
OCTOBER 9 TO 13

ASSOCIATION NEWS

1916 CONVENTION
ATLANTIC CITY
OCTOBER 9 TO 13

Changes in the Tentative Program for the Atlantic City Convention of the Association Are Announced—
At a Meeting of the Manila Company Section the Duties of Trainmen
Were Discussed

Changes in Tentative Convention Program

Since the publication of the tentative convention programs in the issues of the *ELECTRIC RAILWAY JOURNAL* for Aug. 12, page 280, and Sept. 16, page 496, the following changes have been announced:

American Association.—The first committee report on Tuesday morning, Oct. 10, will be by the convention committee instead of the committee on subjects. Capt. S. D. Embick, United States Coast Artillery Corps, will deliver an address on Tuesday morning on "Electric Railways and Preparedness," in place of Brig.-Gen. Erasmus M. Weaver. The last report on this morning will be that of the committee on cost of passenger transportation service.

To the Wednesday morning program two committee reports have been added at the end; those on street traffic and conference with the United States Bureau of Standards as to the Safety Code.

At the Thursday morning session Frank J. Sprague, consulting engineer, New York, will give the address on "The Physical Development of Electric Railways," and A. B. Leach, A. B. Leach & Company, New York, one on "The Financial Development of Electric Railways." The first report on this morning will be one by the committee on recommendations in the president's address.

Accountants' Association.—The committee on passenger, freight and express accounting will not present the report scheduled for Wednesday afternoon.

Engineering Association.—The report of the delegates to the National Good Roads Congress will be the last item on the program for Wednesday afternoon.

Claims Association.—At the Monday morning session the written discussion on "Workmen's Compensation Acts" will be presented by Leonard J. Tynan, attorney Public Service Railway, Newark, N. J.

Transportation and Traffic Association.—At the joint session with the Engineering Association on Tuesday afternoon the block signal committee report will be discussed first.

On Thursday afternoon T. S. Wheelwright, president Virginia Railway & Power Company, Richmond, Va., will speak on "Company Publications, Their Use and Value"; and J. A. Braden, passenger agent Northern Ohio Traction & Light Company, Akron, Ohio, will speak on "Company Publications, Their Preparation and Publication." These are in addition to the speakers on these topics already announced.

Capital Traction Men Get Together

Company section No. 8 started off the fall work with a "get together" meeting on Sept. 14 with a round hundred members present. J. H. Hanna and D. S. Carll, vice-presidents of the company, congratulated the section on the progress made in eight months and expressed the hope that not only would the membership increase but that the members would more actively participate in the programs and discussions.

G. Thomas Dunlop, attorney for the company, described in an instructive manner the operation of the claims and legal departments, and explained how greater co-operation between the claims and other departments

could be fostered. Paul Proctor of the transportation department and Charles Richmond of the mechanical department also entertained the members with piano and vocal numbers. It was announced that the next meeting of the section will be held on Oct. 19.

Discussion of T. & T. Association Reports

President H. A. Nicholl of the Transportation & Traffic Association has sent to the general managers of member companies and others copies of a letter emphasizing the importance of attendance at the convention and participation in its proceedings. He directs attention to the program of the T. & T. Association meeting printed in the September issue of the association magazine and in the *ELECTRIC RAILWAY JOURNAL* for Sept. 16.

Annual Meeting Manufacturers Association

The American Electric Railway Manufacturers Association will hold its annual meeting on Wednesday, Oct. 11. Arrangements have been made for the use of the Park Avenue hall of the Marlborough-Blenheim Hotel. This hall is on the ground floor directly under the main office of the hotel. The exact hour of the meeting will be announced in the Convention Daily issue of the *ELECTRIC RAILWAY JOURNAL*.

Duties of Trainmen Discussed in Manila

Joint company section No. 5 held its nineteenth monthly meeting in Manila on Aug. 8 with forty-three members present. The paper of the evening was on "Duties of Trainmen" by Eugene Wagor, traffic inspector in the transportation department.

Mr. Wagor outlined clearly the elements of cultivating good-will on the part of the public, stating that in years of railroad and street car service he had never found a passenger whose anger could not be dissipated by courteous treatment. He gave the transportation men valuable practical advice, emphasizing the importance of poise. To quote him directly on this point: "Some conductors can have a car full of passengers and their fares all collected with no show of hurry or excitement, and one thus able to give the proper attention to passengers boarding and leaving the car, answering all questions without snapping their heads off. They can give the proper signals to their motormen, thereby preventing costly accidents and long stops which all cost money to their company; and they can do this without causing unnecessary delays to their passengers, who are in a hurry to reach home in time after the completion of their day's work.

"The motorman and conductor must always bear in mind that they have very trying jobs, serving the public, but they also have passengers on their cars who may have had equally as trying a day as themselves. On the other hand, we have the conductor who rides at the same point and with the same kind of a load who has not half collected his fares, his cap is on the side of his head, his coat is unbuttoned and he is wet with perspiration from unnecessary excitement and worry. He

is unable to answer his passengers' questions politely and he signals his motorman to go ahead without looking to see if there are passengers trying to get off or on the car. He misses fares, accepts old or late transfers, etc."

An excellent point made by Mr. Wagor was that the man who uses the most power in operating his car is the most tired out when he leaves the carhouse at night. This is due to the fact that he wastes his own physical energy in applying the brakes with too much force. As another result the equipment suffers also.

The paper was discussed by representatives of several departments, and in closing the discussion, vice-president C. N. Duffy humorously called attention to the advantages which the employees have over the stockholders. He said: "We employees should congratulate ourselves on the advantage that we have over the owners of the property in that we, unlike them, have no money invested in the property subject to the risks and uncertainties of the business; that we receive our wages first while the owners receive theirs in the shape of returns on their investments providing the profit from operation yields such returns; that we as employees could easily change our business if we cared to do so, that the owners of the property could not unless they could get out of it the 14,000,000 pesos which they have invested in it."

COMMUNICATIONS

Mr. Henry on Public Relations Outline

AMERICAN ELECTRIC RAILWAY ASSOCIATION
INDIANAPOLIS, IND., Sept. 14, 1916.

To the Editors:

I have been very much pleased with the work in your issue of Sept. 2 on "Improvement of Public Relations." This is certainly finely done and cannot but result in a great deal of good. I have gone over it carefully and must say that I have never seen anything on the subject so well done. The industry is very much indebted to you for it.

CHARLES L. HENRY, President.

Unit for Comparing Track Upkeep Costs

THE SOUTHWESTERN ELECTRICAL AND GAS ASSOCIATION
DALLAS, TEX., Sept. 8, 1916.

To the Editors:

I have been reading with very much interest the editorials and communications on a desirable unit for comparing track upkeep costs, and the more that the subject is exploited the greater is the proof of the writer's contention that "there ain't no such animal." The reason for this is that there are too many variants—almost as many as there are miles of paved-in electric railway track in the United States. If the variants were confined to the track itself, it would even then hardly be possible to find a unit that could be made to include them all and still be convenient and accurate for comparison. But when it is remembered that there are outside variables almost as innumerable as those in the track, it is easily appreciated that such a unit is an engineering, operating and statistical impossibility. Both of the communications in the Sept. 2 issue of the JOURNAL emphasize this point. Mr. Berry goes into the matter a little more thoroughly than does Mr. Mitchell and, taking up his own suggestions, he would have in the neighborhood

of 1500 variables, divided fairly evenly among the three "classes" which he suggests.

Personally, I fail to see why the time, thought and exertion of the A. E. R. E. A. should be wasted on this matter when any unit on which they might agree would be an absolutely arbitrary one and of no value for general comparison. There are so many pressing matters at the present for the attention of the A. E. R. E. A. which are infinitely more valuable and are infinitely more easy to achieve than this will-o'-the-wisp of a "track upkeep unit."

The same is true with regard to the space occupied by the disquisitions on this subject in the technical journals, in convention and committee proceedings, etc. A thorough reading of all the written matter on this subject shows that it consists almost entirely of either impracticable suggestions for such a unit or of disquisitions on the fact tending to prove that such a unit is an impossibility at the present time.

H. S. COOPER, Secretary.

Corporations as Employers

JOHN A. BEELER, CONSULTING ENGINEER,
BOSTON, MASS., Sept. 16, 1916.

To the Editors:

One does not hear the term "soul-less corporation" used as it was twenty years ago for the reason that the big corporations are usually the best employers. Individual employers cannot begin to give their employees the benefits accorded by means of pensions and kindred advantages accorded by the large incorporated concerns.

The article appearing in the JOURNAL for Sept. 2 on "Improvement of Public Relations" was the most concise and complete résumé of things desirable along those lines that I have seen. From personal experience with a number of the policies enumerated, I know that they pay in every way not even excepting the financial side. However, when a company enters into such methods purely from a selfish desire to profit financially thereby, it means failure from the start.

First and always the plan adopted must be because it is right to do so. That fact established is the first step. Then the administration of the policy must be sincere, never losing sight of the fact that the basis is to do what is right. This fosters internal enthusiasm in the concern which, when it pervades the organization to the point of absorption, bubbles over, inoculating patron and public. Then it is a success.

JOHN A. BEELER.

Name for One-Man Car

CHICAGO, ILL., Sept. 18, 1916.

To the Editors:

Seeing in your issue of Sept. 16 an inquiry as to a suitable name for the "one-man car," I suggest the name "Tram-Bus."

A FRIEND.

New testing codes have been issued by the American Society of Mechanical Engineers, which contain rules for conducting performance tests of power plant apparatus, such as boilers, reciprocating steam engines, steam turbines, pumping machinery, compressors, blower and fans, complete steam power plants, locomotives, gas producers, gas and oil engines and water wheels. These codes have been prepared by a committee of experts, the power test committee, under the chairmanship of George H. Barrus, and represent six years of work of the former testing codes of the Society.

Some Recent Advances in EQUIPMENT AND ITS MAINTENANCE

New Insulator Clamp to Replace Tie Wires—Trolley Wire Which Broke but Six Times in Eight Years—A Track Sander that Hits the Curves—Homemade Rail Grinder with Extra Derailing Wheels—Improved Ball-Bearing Journal Box—Simple Circulating Pump for Air Compressor

Trolley Wire Experiences of the Union Railway, New York

Long Life Records of Wire Which Is Used Under Severe Operating Conditions

BY J. D. KENT

Electrical Engineer of the Company

The earlier installations of trolley wire on the Union Railway lines in the borough of the Bronx, New York, were of No. 00 hard-drawn copper. However, as early as 1908 it was found desirable to install wire of greater toughness and larger cross-section on Westchester Avenue between Kelly Street and a point 200 ft. east of Prospect Avenue. This pioneer installation, put up in the spring of 1908, comprised $\frac{1}{2}$ mile of No. 0000 grooved Phono-Electric wire. This wire has been in use since that date on a route with car headways as low as thirty seconds, therefore a record of its behavior is not out of place.

Like its predecessors, the wire is carried in a trough which is suspended from the cross-struts of the elevated railway structure at this location. Up to 1908 the height of the trolley wire varied according to the height of each cross-strut, so that trolley wheels were frequently derailed at the breaks in grade of the overhead. The new wire, however, was suspended to remain consistently parallel to the paving.

A far more difficult operating condition which could not be solved so readily was that of clearance. The distance between car roof and trolley wire was so scant that the wire had to be offset 10 in. to 12 in. in order that the pole might clear the springs of the trolley base. Naturally, this offset introduced considerable side wear on the wire. Another bad condition was due to the fact that the tracks were on a 4 per cent grade.

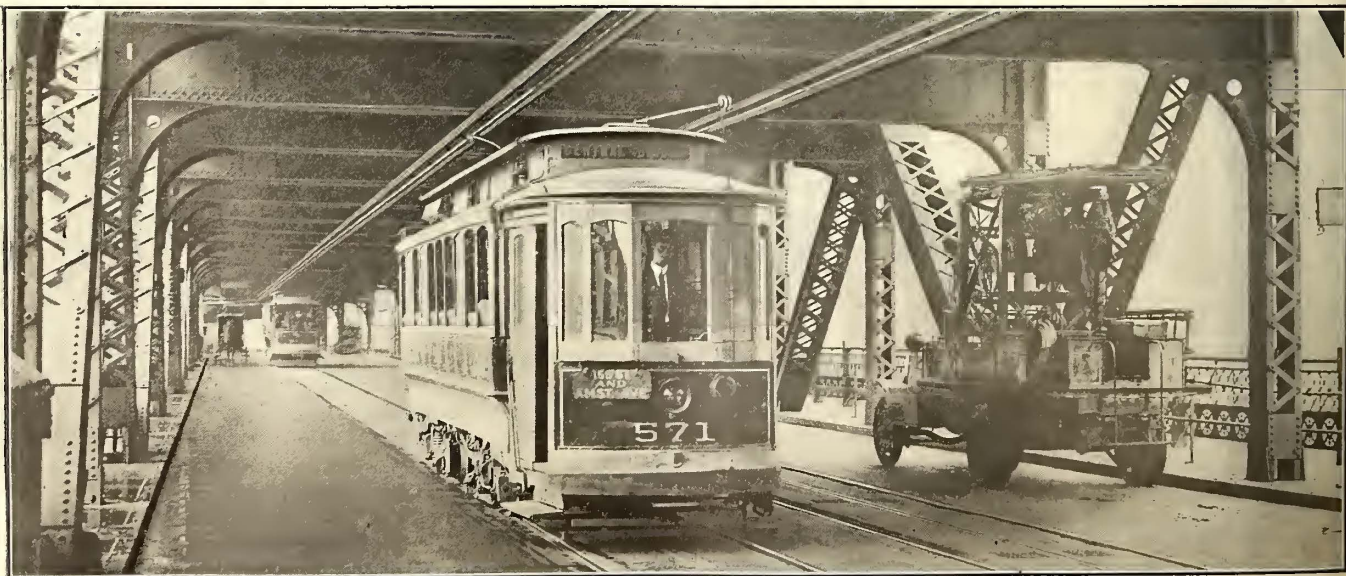
It has been noted that the original wire was No. 00 hard-drawn copper. Under the severe operating conditions described, this wire had to be renewed at least twice a year, and breaks were frequent, sometimes occurring within a week after erection of the wire. The record of the present wire to June, 1916, shows a total of six breaks in eight years, and but one break was due to car operation. The other breaks were due to fouling by high vehicles.

Recent calipering of this pioneer layout shows that the diameter of the wire has worn down from the original dimension of 0.482 in. to an average of 0.360 in., and a minimum of 0.205 in. As long portions of this wire are approaching the 40 per cent wear allowed for this wire, it will be replaced during the current year. When scrapped this No. 0000 composition wire will have given more than sixteen times the life of No. 00 copper—a most remarkable record.

LATER INSTALLATIONS

As a continuation of the original $\frac{1}{2}$ -mile described, the company put up during May and October, 1914, 4 miles more of the same No. 0000 grooved wire to replace No. 00 copper. The $4\frac{1}{2}$ miles cover Westchester Avenue between Third Avenue and Southern Boulevard. Another case of rapid wear was on the $\frac{1}{5}$ -mile stretch under the Third Avenue elevated structure between 145th and 149th Streets. The wires are carried from short bulldog hangers, excessive wear arising in the center of the bulldog clamps which are about $3\frac{1}{2}$ in. long. The No. 00 copper here was replaced with the No. 0000 composition in June, 1914, and is still in good shape, although the rush-hour headway under it is one-half-minute or less.

The latest replacement of a long length of No. 00 copper with grooved No. 0000 composition wire is for 4



BRIDGE ACROSS HARLEM SHIP CANAL SHOWING METHOD OF INSTALLING TROLLEY WIRE IN TROUGHS

miles put up during May and June, 1915, on White Plains Avenue between Gun Hill Road and the city line. The four car lines on this route have a combined headway slightly below two minutes. An unusual installation of No. 0000 Phono-Electric wire is on the bridge which spans the Harlem Ship Canal at 223d Street. The length of this installation, including the bridge approaches, is $\frac{1}{4}$ mile. The wire, extending between Isham Street and 225th Street, replaces an iron bar construction which had been found to be too noisy.

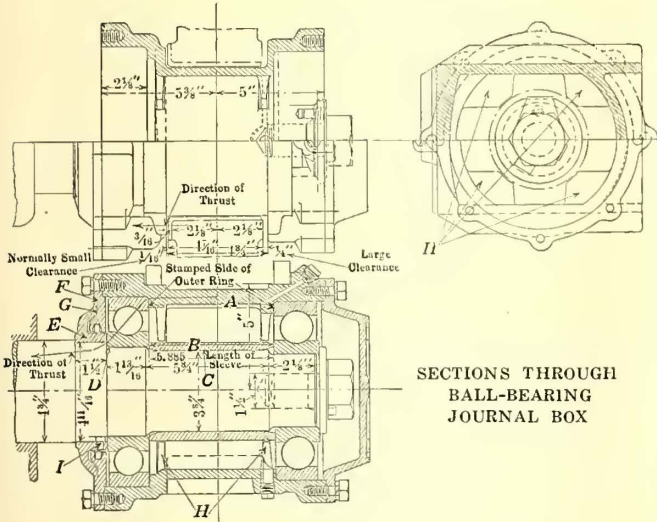
An Interchangeable Ball-Bearing Journal Box

This Box Complete with Bearings Can Be Slipped on the Axle and Locked Securely to It

BY O. BRUENAUER

General Sales Manager Gurney Ball Bearing Company

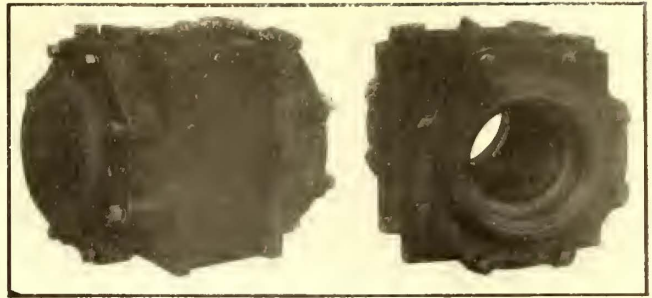
In the *ELECTRIC RAILWAY JOURNAL* of June 10, 1916, page 1036, there appeared an abstract of a paper given by the writer before the Illinois Electric Railways Association on "Application of Ball Bearings to Railway Car Journals." The following description of a journal



box, complete with bearings which has been designed for use on standard trucks is supplementary to that paper.

With this journal box all that is now required by a car builder or user is to turn down the axles to fit the bores of the bearings and provide for a suitable locking device on the end of the axle. The box with the bearings may then be slipped over the axle and may also be taken off as a unit when wheels are to be changed.

The drawing herewith shows the standard box designed for use on a 25-ton street car. The general principles of the design are the same for all purposes and



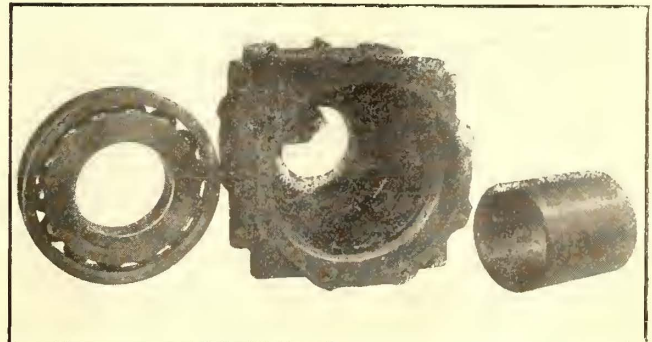
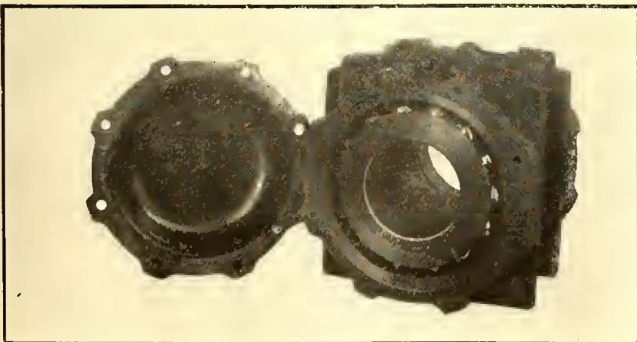
BALL-BEARING JOURNAL BOX READY FOR MOUNTING

the variations are governed merely by the size of bearing that will be required for certain weights of cars and the type of truck to which the boxes are to be applied.

The bearings used in connection with these boxes, which are also shown herewith, are of the "radio-thrust" type. The balls make contact with the races at an angle which affords a thrust capacity of 100 per cent of the radial capacity. Due to the angular contact of these bearings, the slack or end play must be taken up. The method of taking up this end play is one of the characteristic features of the design.

As shown in the drawing which appears opposite, the thrust sides of the outer rings of the two bearings face each other. Between the respective faces of the inner rings of the two bearings is the spacer sleeve C. Its length, B, in relation to the shoulder distance A is such that when the bolt on the end of the axle is screwed down, the inner rings of the bearings with the intermittent spacer sleeve are locked tight against the shoulder D on the axle, and bring the outer rings of the bearings in proper contact with the shoulder of the box. No matter how tight the bolt may be screwed down there can be no cramping of the bearings. The whole design is entirely independent of any adjustment and the locking device, which is the bolt, may be screwed down as hard as the threads will permit.

When the car is going straight ahead the bearings in the box take purely radial load. In going through a right-hand curve the inside face of the pedestal, having normally a clearance of $\frac{1}{16}$ in. with the inside face of the slide of the box, will come in contact with the inside face of the right-hand box, thereby transmitting the thrust in the direction indicated on the drawing onto the inside bearing in the right-hand box. This inside bearing is at this moment carrying the least radial load, while the maximum radial load is carried by the left-hand box. The left-hand box is not in contact in any way laterally with the pedestal and no thrust can be transmitted onto its bearings for the reason that there is very large clearance ($\frac{1}{4}$ in.) between the outside face of the left-hand pedestal and the outside faces of the box slides. In other words, when the car sways to the left the pedestals are in contact only on the inside face



DETAIL VIEWS OF INTERCHANGEABLE BALL-BEARING JOURNAL BOX

of the right-hand box and no thrust whatever is being transmitted on any one of the other three bearings. This method of distributing radial and thrust loads in such a way as to make the bearings with the least radial load carry the thrust and to relieve the bearings carrying the maximum radial load of all thrust makes decidedly for safety and economy of construction.

Since the boxes are furnished complete with the spacer sleeve, perfect interchangeability of parts is obtainable. In consequence any man of ordinary intelligence who is capable of handling a monkey wrench can mount the boxes on the axle. Under ordinary conditions there is no necessity for taking the bearings out of the box. Eight lugs, *H*, support the spacer sleeve in a central position when the box is not on the axle.

On the rear end of the box next to the wheel is a dirt seal which has been mentioned previously. A stationary collar, *F*, is screwed to the box. Collar *E*, revolving with the axle, fits with a given clearance into the collar *F*. As a result there is a grist-mill action with surfaces revolving against each other. Grit or dirt between these two surfaces is driven out and none can get in. The device is at the same time an oil seal. Screw plugs for filling the box with lubricant and for draining it are provided at the top and bottom of the box respectively.

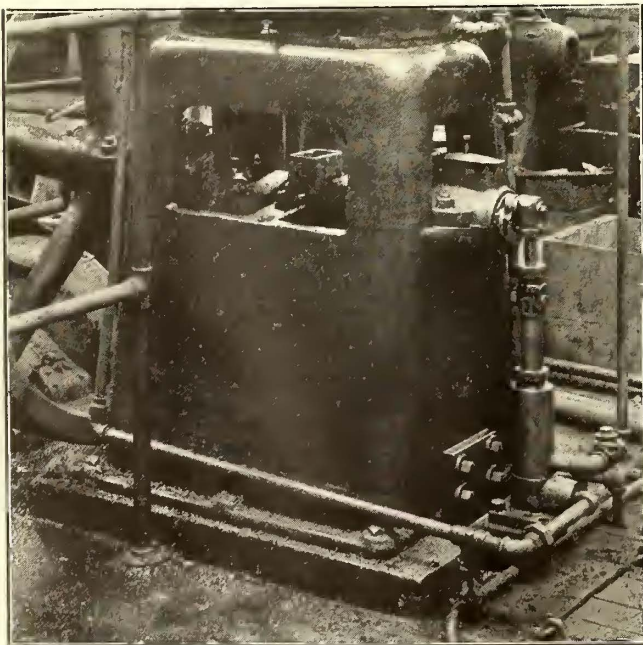
In this type of bearing the designers have aimed to eliminate the difficulties connected with the assembling and adjustment of bearings by mechanics unskilled in such work. By furnishing it as a unit the required accuracy of machinery and absolute interchangeability of parts are assured.

Pump Cuts Down Compressor Circulating Water Cost

BY HARRY BRANSON

Superintendent of Equipment, Lehigh Valley Transit Company, Allentown, Pa.

The yearly water bill of the Madison Street shop of the Lehigh Valley Transit Company, Allentown, Pa., formerly amounted to about \$200. It is now less than \$50. The little pump shown at the side of the air compressor in the accompanying illustration has accomplished this saving for the company.



AIR COMPRESSOR EQUIPPED WITH SMALL CIRCULATING WATER PUMP

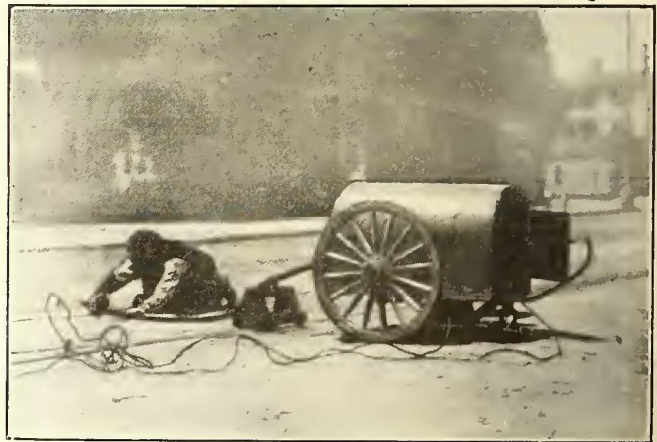
The compressed air for shop use is supplied by an air compressor having two 8-in. x 8-in. cylinders and a speed of 100 r.p.m. Formerly the circulating water for the compressor was taken from the city mains and wasted after passing through the water jacket. A pump, designed by the writer and made in our own shops now maintains a constant supply of circulating water. A tank 18 in. in diameter and 4 ft. high is located about 20 ft. above the compressor. From this tank the water flows by gravity through the compressor jacket and down to the pump, which forces it back to the tank. All of the piping is $\frac{3}{4}$ in. in diameter. The pump plunger is $1\frac{1}{2}$ in. in diameter, and has a 6-in. stroke. It is connected by a short link to a small crank on the compressor crankshaft. The water is taken in at the bottom of the pump through a ball valve. The outlet pipe, which is just above the intake, is provided with a check valve.

This method of supplying cooling water for an air compressor is simple and can be readily applied in any shop as one means of reducing the water bill.

Rail Grinders on the Boston Elevated Railway

The Boston Elevated Railway since 1899 has been using a flexible shaft grinder made up in the company's shops at a cost of about \$350 which includes a 1.5-hp. electric motor installed on a light two-wheel cart, as shown in the accompanying illustration. The shaft of this grinder is made by the Stow Manufacturing Company, of Binghamton, N. Y. The shaft is 8 ft. in length and connected to the motor through a universal joint.

The company now has six of these machines in service. These grinders can be used for work in grooves,



PORTABLE RAIL GRINDER USED IN BOSTON, MASS.

on the tread, and along the gage line. The wheel used is 10 in. in diameter and 1 in. thick for groove or gage-line work, and 1.5 in. thick for the tread grinding.

Considerable work is done with this grinder following the electric welding by the three Indianapolis welders. Other uses are grinding center plates and special work.

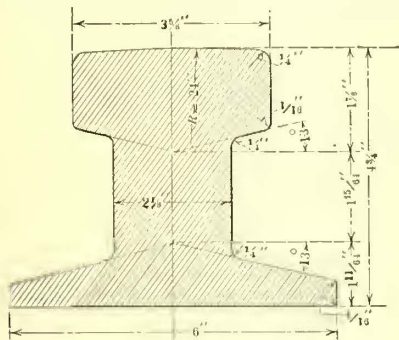
The cart which carries the motor stands alongside the track without impeding traffic to any extent. The wheel and shaft are easily removed on the approach of a car, and as readily replaced in working position, the weight of this portion of the machine being about 30 lb.

With skillful manipulation, which an intelligent trackman soon acquires, excellent work can be done with this machine. The roadmaster estimates that the average cost for grinding joints is about 40 cents each.

150-Lb. Third-Rail for New Lines of the Interborough in New York City

The Interborough Rapid Transit Company will install approximately 100 miles of 150-lb. third-rail on its new lines which form part of the dual system of rapid transit of New York City. The accompanying illustration shows the cross-section of the third-rail that has been developed for these lines. The actual weight is 153 lb. per yard, and the cross-section is slightly more than 15 sq. in. The principal dimensions are shown in the illustration. The rail will be supplied in 60-ft. lengths, 10 per cent of which may be shorts.

The specifications for this rail call for a carbon content of not less than 0.15 per cent and a resistivity of



150-LB. NEW THIRD-RAIL FOR THE INTERBOROUGH RAPID TRANSIT COMPANY

not more than seven times that of annealed copper. The percentages of manganese, sulphur, phosphorus, silicon, etc., are not specified.

A notable fact in connection with this rail is that the percentage of carbon is unusually high for a material having such high conductivity. This means that the rail will be stiffer, that the installation will be simplified, and that it can be used in 60-ft. lengths, thus requiring approximately one-half the usual number of bonds.

A Protected Impedance Bond

The latest development in impedance bonds for use on electrified portions of trunk lines as well as on inter-urban railways is that of the bond shown mounted in its case in the accompanying illustration. The connections for the rails are brought out at the side rather than at the end, and the bond has a cover designed to prevent the breaking of the bond or leads by dragging equipment. The rail connections are brought out in such a way that the cables leaving the bond will lie between two ties. An end opening is provided for the neutral connection between bonds. These bonds are of two capacities, rated at 500 amp. and 1500 amp. direct current per rail. They will take care of a 20 per cent unbalancing without the impedance of the bond being seriously affected.

The purpose of these bonds is to provide a low resistance path around insulated joints for propulsion current and at the same time to provide sufficient impedance to the a.c. signaling current to maintain a potential which will allow the track winding of a relay to be normally energized. A train on the track section to which the bond is connected will short-circuit its windings, in this way producing zero potential across the relay terminals. These bonds are manufactured by the Union Switch & Signal Company, Swissvale, Pa., under the balanced bond patents.

Bonds similar to the above are being used in the electrification of the Chicago, Milwaukee & St. Paul Railway



IMPEDANCE BOND WITH PROTECTING COVER DESIGNED TO FIT BETWEEN TWO TIES

through the Bitter Root and Big Belt Mountains in Montana and Idaho.

Steel Ties Used in Shallow Roadbed

The accompanying illustration shows the installation of track of the Mahoning & Shenango Railway & Light Company on the new concrete arch bridge across the Mahoning River at Warren, Ohio. This is another instance in which International twin steel ties have been used on a concrete bridge where the clearance between the base of rail and the concrete floor of the bridge is small. As shown in the illustration, the top and sides of the track trench are painted with a heavy tar preparation, so that the track construction can be renewed at the end of its life without disturbing the bridge floor.

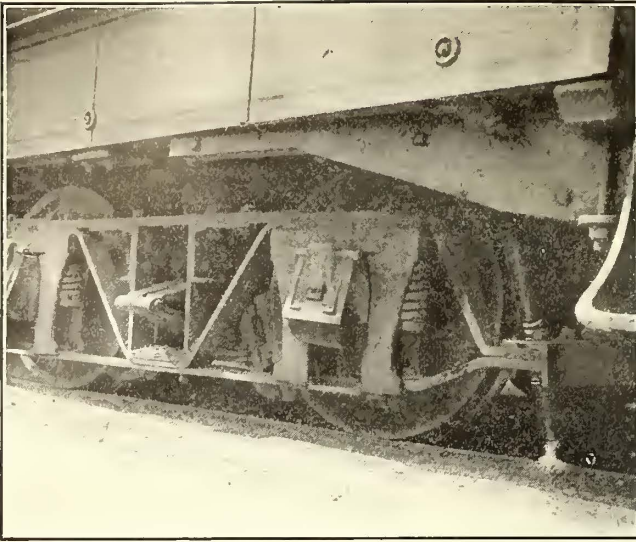
The first large installation in which the steel twin ties were placed on concrete bridge floors was the con-



TRACK INSTALLATION ON CONCRETE BRIDGE, WARREN, OHIO

struction of the track on the Brooklyn-Brighton Bridge at Cleveland, Ohio, described in the *ELECTRIC RAILWAY JOURNAL* for Oct. 16, 1915, page 834. Here the clearance under the rail was only 4 in. Since then there have been many instances in which engineers have used the shallow steel ties for locations having limited clearance.

The Kansas City Railway's mechanical department welds all its broken motor frames by the thermit process. Although it is somewhat more expensive than other welding processes that could be employed, the thermit furnishes a much stronger weld, at least one has never been broken in service, and it is possible to reinforce the motor frame wherever this is required.



TRACK SANDER INSTALLED ON A DOUBLE-TRUCK CAR OF THE MILWAUKEE NORTHERN RAILWAY

A Cheap Track Sander

The Haese Track Sander Company, Milwaukee, Wis., has recently placed on the market a new track sander, shown herewith. This device consists of a flexible telescoping spout of No. 16-gage, cold-rolled steel and is double-walled throughout to be used in connection with air. The inner lining is constructed so that the sand cannot escape, and it is impossible for water or slush to get up into the sander. The upper end of this sander is fastened to the car and the lower end to the truck, which causes it to follow the rail with the truck as shown.

This sander has been used in actual service for more than a year on the Milwaukee Northern Railway and has been found to give satisfactory results. According to the claims of the maker, car wheels last longer, rail wear on sharp curves is reduced, time and power are saved in starting, and accidents are prevented by the use of the sander.

A Well-Designed Home-Made Portable Air Compressor

Frequent calls for compressed air service in various parts of the repair shops of the Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich., as

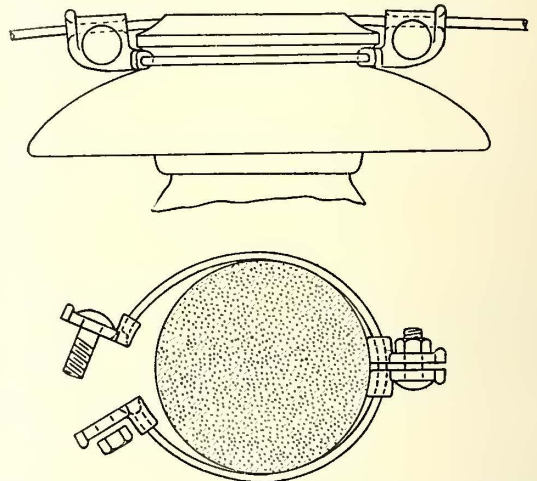


AIR COMPRESSOR MOUNTED ON A TRUCK IN SHOPS OF BENTON HARBOR-ST. JOE RAILWAY

well as at the company's substations, created a demand for a portable air compressor outfit. This was supplied by the compactly-built, well-designed equipment which is shown in the accompanying illustration. A standard Westinghouse 14-cu. ft. air compressor is mounted on a substantially built truck and connected through a governor and automatic control equipment to a reservoir tank mounted on a strap-iron frame over the compressor proper. The truck was built in the railway's shops, and the complete air compressor outfit was assembled there. The automatic control cuts the compressor out of service when the air pressure reaches 70 lb. and puts it in service again at 65 lb. The compressor is equipped with a flexible cord to connect it to the source of energy, and a section of hose makes it possible to furnish compressed air for practically any service. The labor cost in assembling this equipment was about \$10, and aside from the wheels on the truck, the material and the equipment used was some that had been on hand in the railway company's shops.

A Novel Insulator Clamp

An improved insulator clamp, shown herewith, has just been patented and placed on the market by Edwin D. Hatch, consulting engineer, New York City. This



NEW INSULATOR CLAMP WHICH REPLACES TIE WIRE

device is made of two clamping members and a piece of wire extending around the insulator head. Each clamp consists of two pieces of sherardized malleable iron with a bolt extending through the center. The clamps are hinged at the ends so that they can readily take any vertical angle above or below a horizontal which the line wire may assume in passing over a hill or up the side of a mountain.

According to the maker, these insulator clamps are not rigid, but are designed, nevertheless, to be used with any size of insulator. Clamps of other designs are said to have injured insulators by chipping or causing crystallization of the line wires. Again, clamps which have not been designed to meet slight variations in insulator sizes either fit the insulator head too tightly or too loosely, with the result that some part is injured. Many times, line wires have been carried entirely above the insulators when they were somewhat smaller than usual, thus causing the clamps to carry the load instead of the top of the insulators. The clamping members at each end are free to move around the encircling wire so that, should the insulator top groove be slightly off center, adjustment can readily be made for such a condition.

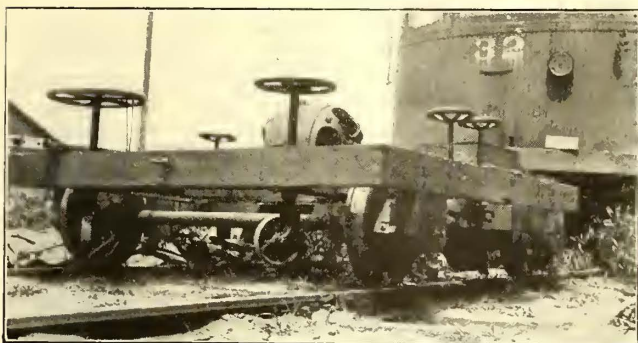
It is claimed that this clamp can be installed at prac-

tically the same cost as an ordinary tie, since it takes a much shorter time to attach the clamps to the line wire, and that the work can be done for about half the amount it costs for an ordinary tie, for the reason that cheap labor can be employed. The method of installing these clamps is to pull the wire to the correct tension with block and tackle for a number of spans, and while it is being thus held the wire is inserted in the clamp, the bolt tightened up, and the blocks slacked off.

Rail Grinder Made from Scrap

Frequently a little skill and ingenuity will make a repair shop scrap heap or a quantity of stored useless material yield a useful piece of equipment. In any event was the case with the Benton Harbor-St. Joe Railway & Light Company, Benton Harbor, Mich., when the need for a rail grinder coupled with a resourceful master mechanic produced one which operates perfectly. This rail grinder consists of a wooden framed truck fitted with a motor-driven grinding wheel which is adjustable both vertically and horizontally. The truck is equipped with a set of adjustable wheels for removing it from the track when on paved streets. A view of this grinder is shown in the accompanying illustration.

The grinding wheel is driven by a chain belt which



HOME-MADE RAIL GRINDER, USED ON THE BENTON HARBOR-ST. JOE RAILWAY

connects it to a 5-hp. d.-c. motor. The motor was a piece of discarded equipment, and so were the chain belt and the shaft on which the 4-in. x 12-in. carborundum grinding wheel is mounted. The motor is set up on a 4-in. x 16-in. plank which also carries the grinding wheel. The plank in turn is supported on three vertical screws fitted with hand wheels, so that the grinding wheel may be adjusted vertically, and one horizontal hand screw gives it a 4-in. horizontal adjustment. The grinding wheel is mounted over the track rail and the top is boxed and covered with a glass shield so that the operation may be observed, and at the same time the eyes of the workmen are protected. Two hand screws with swiveled castings and flanged wheels are mounted on one end of the grinder truck so that it may be removed from the track by lowering these wheels to the pavement. Two men experience no difficulty in derailling the grinder which weighs about 800 lb.

The track wheels and axles upon which the grinder is mounted were also reclaimed from the scrap pile. The wheels are 20 in. in diameter and they have 2-in. treads and 3/4-in. flanges. The hand screws were obtained from a local junk dealer so that practically the only new material in the complete grinder was the carborundum grinding wheel and the lumber and bolts used to fasten the truck frame together. When this grinder is moved over the road it is coupled to one of the roadway utility cars, and when in service it is moved along the track by hand.



PIT LIGHTS IN SHOPS OF LEHIGH VALLEY TRANSIT COMPANY

Pit Lights Mounted on Girder Rail

The proper lighting of the repair pits in railway shops is a matter which is often neglected. The result is that insufficient illumination is obtained, the lamps are frequently broken and short-circuits occur in the long lamp cords which are commonly used.

To obviate these difficulties, Harry Branson, superintendent of equipment Lehigh Valley Transit Company, has mounted the pit lights in the Madison Street shops of the company on the side of the track girder rails, as shown by the accompanying illustration. The lamps are protected by a heavy wire netting, but they are accessible on the ends so that they can be easily renewed. The heavy sheet of tin between the lamps and the rail acts as an excellent reflector.

Corrosion Forces Rail Renewal

As a general proposition, corrosion is seldom the actual cause for making a rail renewal, although in many instances it is largely contributory. Recently Charles H. Clark, engineer maintenance of way Cleveland Railway, in taking an inventory of the tracks in need of rehabilitation during the construction season of 1916 made an interesting experiment to determine the extent to which a rail was corroded. Although the exposed surface of the rail shown in the accompanying illustration indicated that repairs would carry the track over for at least another season, an examination of the rail web showed that it was practically corroded through. The accompanying illustration shows where Mr. Clark drove an ordinary clay pick through the web. It will also be noted that practically a knife edge, indicating the advanced stage of the corrosion, had formed along the edges of the rail base.



VIEW OF CLAY PICK DRIVEN THROUGH CORRODED RAIL WEB

NEWS OF ELECTRIC RAILWAYS

NEW YORK STRIKES WELL IN HAND

Threat of General Trade Union Strike, However, May Cause Further Trouble in New York City

A frantic effort on the part of leaders of the Amalgamated Association of Street and Electric Railway Employees to bolster up the losing strikes in New York City, in the face of constantly bettered service on the surface lines affected, has been the outstanding feature during the last week. Since this paper went to press last week the strike situation has spread to cover the New York & Queens County Railway, thus involving all the lines except one that were included under the peace settlements of Aug. 6 and 7. Under the threat of a general sympathetic strike of trade unionists in the metropolis, the strikers have been endeavoring to induce the public authorities and business interests to force the companies to bow to the union's terms, but the railways have steadfastly refused to treat with the Amalgamated Association in any way, and the proposal of a general sympathetic strike has been received with marked apathy by trade union leaders and with frank displeasure by the public. In general, therefore, the situation has shown improvement, except that disorder in the last few days has increased. Increased vigilance on the part of the police, however, and the determination of the city authorities to punish guilty strikers to the full extent of the law bid fair to keep the situation in hand.

To take up the strike story where left off last week—on Friday, Sept. 15, the Third Avenue Railway announced new wage schedules of 27 cents per hour for the first year and 30 cents per hour thereafter for its motormen and conductors, the former rates being 26 cents per hour for the first year, 29 cents per hour for the second-fifth years and 30 cents per hour thereafter. The storage-battery car rates were also increased from 25 cents per hour the first year to 26 cents per hour, and from 27 cents to 28 cents thereafter.

Late in the same day the Public Service Commission for the First District issued a formal finding of culpability against the organized employees of the Third Avenue Railway for their breach of the peace settlement of Aug. 7. All the commissioners joined with Chairman Straus and Mayor Mitchel in holding that the strike was an "action without justification and in violation of their compact." They stated that the strike should be called off at once, but this suggestion was disregarded by the union leaders.

On Saturday the Brotherhood of New York Railways Employees offered to permit strikers to return to work as members of this organization. Attached to this offer was the condition that they should return as workers lower in seniority rank than those who had remained loyal, as well as those who had entered the service of the company since the strike started. The returning strikers, however, would receive the same pay they had prior to the new wage scale of Sept. 3, and they would not forfeit their seniority to a greater extent than falling in line behind those now in the service of the company. Their conditions would be still further improved after six months of faithful service.

The first definite action along the line of authorizing a general sympathetic strike of trade unionists was taken on Friday night, when the Central Federated Union of New York recommended that "as a preliminary to the general strike, all unionists, such as Tidewater Boatmen and Longshoremen, International Brotherhood of Teamsters, engineers, firemen and plumbers, and such other trades whose labor is keeping the traction cars running, stop work," and that there be a general boycott of all the traction lines in New York. Beginning with Saturday, however, it became increasingly evident that the unions involved in this "preliminary move" were less interested in the losing fight of the Amalgamated Association than in the possible settlement of grievances of their own. The first step in the general strike was expected on Monday, Sept. 18, but only two of the unions mentioned in the recommendation of the Central Federated

Union took strike votes, and these concerned demands of their own to be submitted in due course.

The union leaders on Monday at a conference with Mayor Mitchel made another attempt to force the traction lines to arbitrate certain points, and the advisory committee of unionists issued a statement to the effect that if by Friday, Sept. 22, at 2 p. m., the Mayor had failed to secure a peace settlement, a time for the general strike would be designated. The traction officials said, however, that the strikes were broken, that they had to look out for the interests of their loyal employees and that there was nothing to arbitrate. Conferences during the week between the traction officials, the city authorities and representatives of the Merchants' Association and the Chamber of Commerce failed to bring any change in the situation.

Late on Thursday, Sept. 21, Mayor Mitchel and Chairman Straus sent a letter to the trade union leaders, stating in part as follows: "Conditions which you have indicated might follow general sympathetic strikes would be grossly violative of the laws and would convulse the civilized and orderly life of the community. We wish to make it unmistakably clear to you that to prevent those conditions the full civil and military powers conferred by law upon the Mayor will be employed."

The existing strike situation was somewhat broadened on Monday night by the entrance of some union employees of the New York & Queens County Railway into the controversy. About 200 out of 560 motormen and conductors of this line, in spite of the settlement agreement of Aug. 7, went out on strike at midnight, because, it was alleged, the Queens company had furnished men for Manhattan lines to use as strikebreakers. President William O. Wood denied that any employees had been sent to help out in Manhattan.

The service offered on the various lines during the week showed improvement. The rapid transit lines continued to carry more than the number of passengers carried a year ago, and the surface operation increased each day. From 327 cars on Thursday, Sept. 14, the New York Railways without strikebreakers increased its service to 540 cars on Thursday, Sept. 21, out of a normal of about 1290. During the same period the service of the Third Avenue lines in Manhattan rose from eighty-three cars to 139 cars, the normal being 505 cars, while the allied Union Railway in the Bronx increased its car total from 141 to 181, the normal being 252. The Second Avenue Railroad with a normal of 105 cars, did not increase its service by more than a few cars to a total of twenty-seven. Starting with half operation after the strike on Monday night, the New York & Queens County Railway gradually bettered its service. The lines of the Yonkers Railroad and the Westchester Electric Railroad, the Westchester County subsidiaries of the Third Avenue Railway, offered no service during the week on account of the restrictive experience ordinances in force.

No night service was offered on the surface lines in Manhattan until Monday, Sept. 18, when three Third Avenue Railway cars ran on cross-town lines until 11 p. m. After that this company kept on increasing its night service, and the New York Railways made an endeavor to lengthen its service gradually, but the lines were handicapped by outbreaks of violence, the first really serious ones since the strikes started. On Wednesday night strikers attacked four cars near Central Park and had to be dispersed by police reserves. After this the district attorney's office announced that strikers and strike sympathizers guilty of injuring persons through attacks on street cars would be prosecuted under the section of the penal law providing for penitentiary sentences of five to twenty years for such offences. On Wednesday night Theodore P. Shonts, as president of the Interborough Rapid Transit Company and the New York Railways, announced that a reward of \$200 would be paid for evidence resulting in the conviction of any person who injured a passenger by throwing missiles.

PURCHASE OF POWER RECOMMENDED

Engineers Advise Against Rehabilitation of Old Plant at Cleveland

At a conference in Cleveland, Ohio, on Sept. 15 it was decided to abandon and scrap the Cedar Avenue power station of the Cleveland Railway as the result of an unfavorable report from F. Sargent of Sargent & Lundy, and to purchase power from the Cleveland Illuminating Company and build a new 12,000-kw. capacity 60-cycle substation on the site of the old power house.

Mr. Sargent's report to Fielder Sanders, Street Railway Commissioner of Cleveland, follows in part:

"I have made an examination of the Cedar Avenue power plant of the Cleveland Railway and have investigated from an engineering point of view the proposed scheme of the Cleveland Railway for the installation of a new mixed pressure turbine of 5000 kw. capacity and beg to submit the following comments:

"The Cedar Avenue power plant of the Cleveland Railway was originally designed and located as part of a dual manufacturing process, in which the steam was first used for the manufacture of electric power for the railway by reciprocating engines and direct current generators and the exhaust steam was used for the manufacture of salt.

"The plant was evidently located from a point of view of the economic distribution of a certain amount of direct current for driving the street railways and more or less with a view of a favorable location for the manufacture of salt.

"The part of the process relating to the manufacture of salt has now been permanently abandoned and the plant is used solely for the manufacture of electric power, the steam being exhausted into the atmosphere.

"The plant as it now stands, while in a good state of repair and very reliable in operation, is not economical. From a fuel consumption point of view it requires at least double the coal per unit of output as compared with the latest practice in large plants. Progress has been such since this plant was built that the machinery, from the boilers to the generators inclusive, is obsolete in type and arrangement as compared with the best modern practice.

"The location of the plant is such that no natural water supply suitable for condensing purposes is available and artificial cooling of condensing water in this locality is not practicable because of the liability of damages to surrounding property from entrained water blown out of the towers and freezing where it falls in winter time and wetting surrounding property in summer time. In high winds the discharged finely divided water will carry one-half mile or more from the plant. We have experienced much difficulty from damage suits due to the use of cooling towers in similar locations in Chicago.

"It is a great mistake to erect cooling towers of large capacity in thickly populated districts of large cities because it is bound to lead to trouble with surrounding property owners.

"This means that the scheme proposed by the Cleveland Railway, in our opinion, is not a practicable one and is not competent to earn the economy that has been estimated in the report when this question of damages to surrounding property is fully considered.

"There is no practicable way that we can recommend to rehabilitate this plant in a manner that will pay the cost of rehabilitation.

"In view of the situation as herein presented it will probably be unnecessary for us to prepare any further recommendations in regard to power supply, but if anything more is desired we shall be very glad to meet your wishes."

Mr. Sanders' report to the City Council follows in part:

"I beg to report that the request of the railway company for permission to rehabilitate its Cedar Avenue plant has been carefully investigated by this office. As a result of an investigation of months by the regular engineering force and consulting experts especially hired in the city, your commissioner has come to the conclusion that the Cedar Avenue power plant as now constituted is causing a great loss to the railway company, that power is being generated there at just about twice what it should cost. This is not due, however, to uneconomical management, but to the inherent drawbacks of the plant itself, the same being ineffi-

cient, obsolete, and requiring twice the coal per unit of power that it should. We feel, therefore, that there is a loss at the present time of nearly \$200,000 a year in the operation of this plant as now constituted which loss will continue to grow instead of to decrease. The proposition of the railway company to rehabilitate is, in our opinion, impracticable. After much discussion with the railway engineers, they now concur in that view, and agree even if rehabilitated according to their scheme, that power cannot be produced as cheaply as it can be bought in this city, and further, that the resultant damage to the neighborhood of the plant will be great.

"In view of the fact that the amount of money involved in this plant including the salt works, exclusive of land, is estimated at \$1,265,565, and the importance of the question of disposing of it obvious, your commissioner was unwilling to rely wholly upon the opinion of your engineers and the company's engineers and secured the advice of Sargent & Lundy, electrical engineers of Chicago. Frederick Sargent made a careful investigation of the plant as it now stands and reports that 'there is no practical way that we can recommend to rehabilitate this plant in a manner that will pay the cost of rehabilitation. The scheme proposed by the Cleveland Railway, in our opinion, is not a practicable one and is not competent to earn the economy.' I inclose herewith a copy of his report.

"The reproduction value of the plant, including the salt works, but exclusive of land, has been carefully estimated at \$1,265,565, from which, however, will be deducted, if your body approves the proposition, the salvage value of the machinery, which will amount to approximately \$115,565. Under the Tayler franchise, as now constituted, if the plant is abandoned, it will be necessary for Council to authorize an over-expenditure in the maintenance account of \$1,265,565, this sum of money will be placed in a suspense account and by agreement between the company and the city will be reduced at the rate of \$20,000 a month until it is extinguished, thereby spreading the amount over a period of five years. This procedure, if carried out, in my opinion, will not affect existing conditions, because according to the figures the purchase of power will save approximately \$200,000 a year. At the end of five years the initial loss will be made good, and then there will be at least ten years of steady saving of \$200,000 a year during the life of a new substation.

"In addition to authorizing this over-expenditure in maintenance, it will be necessary for Council to authorize the expenditure of \$250,000 for the building of a converting substation at the site of the Cedar Avenue power plant, which will be a capital charge, and also to authorize the entering into a contract by the Cleveland Railway for the purchase of its power in the future.

"I beg to recommend that Council take this action immediately, as it seems, in my opinion, to be absolutely necessary and advisable."

\$1,000,000 FREIGHT TERMINAL PROPOSED FOR DETROIT

An investment of \$1,000,000 is involved in the plans of the Detroit (Mich.) United Railway for the construction of its freight terminal in Detroit to take the place of the terminal it has long occupied at Congress and Fifth Streets.

The new terminal will occupy nearly three city blocks between Dequinder and Chene Streets and Monroe Avenue and Macomb Street. The property includes the old Pullman car shops purchased by the company several years ago and used as the general shops of the company. Outgrowing the accommodations as general shops, the company has been gradually constructing handsome new shop units on its Highland Park property. These units, now all nearly completed and occupied, form one of the most perfect car shops in the country. East of the old car shops at Dequinder and Macomb Streets the company has purchased the additional territory required and is preparing to remove or raze the buildings now on it.

The plans for the new freight terminal are practically ready and when the work is done Detroit will have the finest accommodations possible with a layout of tracks designed for exceptionally rapid handling of freight.

MAYOR CALLS AMALGAMATED OFFICER A MIGHTY BAD MAN

By unanimous vote the City Commission of Harrisburg, Pa., on Sept. 12 refused to amend the jitney regulations and referred the initiative petition presented through the efforts of the striking trolley men of the Harrisburg Railways to the people, who will vote upon the measure at the election on Nov. 7. Reduction of the bond from \$2,000 to a \$1,000 pool, to cut down the license fees and the penalties for violations were prayed for. Behind the movement were the striking trolley men and jitney drivers who were led in their campaign by J. J. Thorpe, of the Amalgamated Association. Mr. Thorpe talked to newspapermen in the Council Chamber just after the passage of the measure. He is reported to have said:

"What could we expect? We didn't expect anything else but that they would do exactly what they have done; they are only controlled by the Harrisburg Railways and merely are carrying out the instructions of the Harrisburg Railways and not the request of the public. The people will be on the job at the polls this fall and there will be the damndest stir-up in politics round here that you have ever seen. Some of our friends will take the walking plank."

Mayor Meals is reported to have commented as follows on Mr. Thorpe's statement:

"If he doesn't shut his head we'll make him. Our oaths of office, I suppose, mean nothing in his estimation. He's not even a citizen here; he's only here in the interests of the few dollars he gets out of it. The strike could and would have been settled—but for him—six or eight weeks ago. On a Tuesday morning, I don't recollect the exact date, he would not let his men meet the company except as a committee from the union. On the following Friday he agreed to eliminate the union, and so submitted this to me in writing—and I've got the typewritten statement. It is signed, I think, by Hugh McLaughlin, but it came through Thorpe. Then immediately after that President Musser stated that he would not meet the strikers except individually. The citizens of Harrisburg did nothing to him, yet he strikes back at the citizens by threatening to organize every branch of labor, even, I suppose, to the washwomen and street sweepers. Those are the kind of dogs that we don't want in Harrisburg. You can say for me that I consider him a mighty bad man."

PRESIDENT BRUSH OUTLINES BOSTON ELEVATED NEEDS

In an interview in the *Boston Globe* of Sept. 18, Matthew C. Brush, president of the Boston Elevated Railway, referred briefly to the problems confronting the company in relation to the forthcoming investigation of its financial requirements by a legislative recess commission. Hearings will begin at the State House, Boston, on Sept. 25. Mr. Brush stated that at that time the company will present a full statement of the conditions which the road is facing. He emphasized the burdens placed upon the system by the construction of subways and intimated that it is not fair that the entire burden of expense in this direction should fall upon the car-rider. The increase of land values in West Roxbury, Cambridge, Watertown, Belmont, Arlington, Brookline, Brighton and Newton following the opening of subways reducing the running time between these suburbs and the center of Boston was cited and the present frequent service contrasted with former facilities. The burdens of the transfer situation were also touched upon. Fifteen million paper transfers were wasted last year by passengers. In the course of his remarks Mr. Brush said:

"It is a delicate problem that of transfers, but its treatment will certainly be one of the important points to be set before the committee. For in one way or another we must have increased net revenue for our company, and that means relief in some sort from the burdens—of which I consider the subways the greatest—which our company carries and which are imposed on no other company doing a like business elsewhere. I want the people of Greater Boston to take pride in this big company of ours. When a hitch occurs and some man finds he is not getting the service he thinks he should, I want him to realize that it is not because of the size of our job, in handling 600,000,000 persons a year, and

not because we, the company officials, are not trying to give the best we can. Everybody in Boston has always been very kind to me, and I appreciate it, and I shall do my best for them and for Boston. I have no secrets here; you can come and see me at any time, and what you ask, if I am able, I will answer. Square dealing and all above board—that is all I can offer you."

COURSE IN CONCRETE CONSTRUCTION WORK OFFERED

The Portland Cement Association, representing the manufacturers of Portland cement in the United States and Canada, recognizing the value of schooling and appreciating the training that a young man may gain even by a short association with a competent corps of instructors, is co-operating with the Lewis Institute, Madison and Robey Streets, Chicago, in offering a special course in concrete work for contractors and foremen. The course, which will be a practical one, will open on Monday, Oct. 9. Prominent engineers and contractors will assist in the instruction and lectures. The expense for attendance will be small and there are no entrance requirements. Electric railway engineers are invited to consider the value of this course for their foremen in charge of concrete work.

RESTORING TRAFFIC IN PARIS

In the *ELECTRIC RAILWAY JOURNAL* for Sept. 9, page 463, an item was published to the effect that street cars of the Paris (Tex.) Transit Company were again being operated by means of power from the plant of the Texas Power & Light Company at Waco. The item as worded may have conveyed the impression to some readers that the Paris Transit Company had not been operating cars since March. The fire in Paris to which reference was made started about 5.30 p. m. on March 21, destroyed nearly all of the business district and 50 per cent of the residences. The Paris Transit Company lost four cars out of the total of eight, and more than 2 miles of trolley were down out of a total of 6 miles. At 1 p. m. on the afternoon of March 24, three days later, service was resumed with the four cars that had been saved, one of the principal deterrents to the earlier operation of cars being the impassable condition of the streets, due to inability to secure sufficient labor to clear away the debris promptly. The old plant of the company was completely destroyed by fire, but power was immediately available from a new Diesel plant recently completed and in full operating condition at the time of the fire. Four days later, or about March 28, cars purchased in Waco were received and placed in service by the Paris Transit Company, thus completely restoring the schedule. The company reports that the receipts have increased steadily and are at the highest they have ever been. The Waco connection referred to in the *ELECTRIC RAILWAY JOURNAL* of Sept. 9 was recently effected to assist the local plant in taking care of the greatly increased loads due to power consumption by local industrial concerns. In the *ELECTRIC RAILWAY JOURNAL* of May 6, 1916, page 861, appeared an article on the fire in Paris giving the facts in connection therewith and illustrated with halftones showing the ruins of the carhouse of the Paris Transit Company and the ruins of the office and power plant of the Texas Power & Light Company.

Wages Increased in Port Arthur.—The Port Arthur (Tex.) Traction Company has advanced the wages of its trainmen. The increases range from 1 cent an hour for newly employed men to 3 cents an hour for men in the employ of the company for five years or longer.

Movies of Electrics.—For the purpose of informing Pennsylvania Railroad employees of developments in the electrification of steam railroads, motion pictures of the electrification of seven railroads were shown on Sept. 20 at the West Philadelphia Branch of the Young Men's Christian Association in Philadelphia.

New Working Agreement in Manchester.—An agreement which will run for two and a half years has been reached between the Manchester (N. H.) Street Railway and its employees. The employees asked for an increase in wages and other changes in working conditions, including car tickets entitling them to ride on the cars without the neces-

sity of showing their badges in lieu of regular fare. The new agreement makes no change in the hours of labor, but provides for an increase in wages. The request for the change to car tickets for the employees was waived by the representatives of the men.

Increase in Wages on Niagara Gorge Line.—Burt L. Jones, general manager of the Niagara Gorge Railway, Niagara Falls, N. Y., operating the American Niagara gorge route line, announces a new wage scale for platform-men. All employees, including track and carhouse men, have been granted voluntary increases, effective at once. The scale of the platform-men is: First-year men, \$65 a month; 26 cents an hour for second-year men; 28 cents an hour for third year; 30 cents an hour for fourth-year men, and 33 cents an hour for all who have been with the company more than four years.

Postponement of Cincinnati Loop Lease Vote.—The Rapid Transit Commission of Cincinnati, Ohio, has apparently reached the conclusion that submission of the terms of the lease of the proposed rapid transit loop to the voters at the November election is impossible. So many features enter into this important matter that the seven weeks remaining before the election will not be sufficient for their consideration. Frank S. Krug, chief engineer of the commission, said that the computation of the data secured through the traffic survey can not be completed before Nov. 1. These data are of importance in fixing the terms of the lease and not much headway can be made until the results can be had for use.

Philadelphia Transit Conference Postponed.—A conference between Mayor Smith, William Hancock and Col. Sheldon Potter representing the city of Philadelphia, Pa., and T. E. Mitten, president of the Philadelphia Rapid Transit Company, Director of City Transit Twining and Ellis Ames Ballard, counsel for the transit company, scheduled for Sept. 21, has been indefinitely postponed. This action was taken by Mayor Smith when he learned that Mr. Mitten would be unable to be present because of a death in the family. The Mayor said he would call another meeting as soon as Mr. Mitten returned to the city and could take up the business. A conference of the city transit directors to consider the conditions of the lease of the proposed new rapid transit lines to the Philadelphia Rapid Transit Company was held earlier in the week.

Violence Resorted to in Harrisburg.—The first violence growing out of the strike of the trainmen of the Harrisburg (Pa.) Railways in several weeks occurred Saturday night, Sept. 16, when Motorman Martin A. Brandt had his skull fractured by a rock. Brandt was operating a Hummelstown line car which ran over and killed George W. Fox, who was lying intoxicated on the car tracks in a lonely place 5 miles east of the city. When Brandt returned from Hummelstown near the scene of the accident a huge rock was hurled through the window striking him on the head. He stuck to his post for more than a half mile and then fell unconscious. The county police and detectives in the employ of the Harrisburg Railways are at work on clues which they believe will lead to the arrest and conviction of the motorman's assailants.

Schenectady Arbitration Award Announced.—The arbitrators' award in the settlement of the wage differences between the Schenectady (N. Y.) Railway and its employees has been made public. It provides for a three-year agreement, increased wages and the restoration of the practice of giving passes to employees. Motormen and conductors will get a 2-cent increase from May 1, 1916; one-half cent increase next May and one-half cent increase in 1918. Other employees of the company also benefit. The situation with respect to wages on the Schenectady Railway became acute in May, when the men struck to enforce their demand for a flat increase of 5 cents an hour. The company at that time offered an increase of 2 cents an hour, to be in effect for the next two years, and an additional 1-cent increase for the third year. Arbitration was agreed to after the men had been out on strike thirty-six hours. Only the questions of wages and length of the agreement were arbitrated. The conditions under which the arbitration was conducted were published in the ELECTRIC RAILWAY JOURNAL for May 13, page 920.

Financial and Corporate

RAILWAY INVESTORS ORGANIZE

The committee of stockholders under the leadership of John Muir, a New York banker, which became active at the time of the recent railway labor crisis in Washington, has now organized on a permanent basis as the Railway Investors' League. An official advertisement states:

"The Railway Investors' League has been formed to consolidate for protective and beneficial action that immense power and influence now unused but vested in thousands of unorganized small investors. Whether you own one share or one thousand shares of stock, a single \$100 bond or larger amounts, your active aid is needed. You can help to protect your own investment and safeguard the principles of constructive enterprise on which the country has been built up. The purpose of the league is to assert, maintain and defend the rights of railway security holders, to guard against attacks from without and within.

"Impelled by the passage in Congress of the Adamson law, under which four classes of railroad employees are granted a large increase in wages without consideration of the merits of their demand, the general need for such an organization became imperative. Refusal on the part of the defiant labor leaders to abide by the principle of arbitration, intensified by presidential endorsement, has created a natural fear of similar demands from other employees. Guided by this and other unfortunate experiences which have demonstrated the necessity, the organization committee issued a preliminary statement which is meeting with a quick response."

TAXABLE VALUATIONS IN IOWA

The 1916 taxable valuations for interurban electric railroads in Iowa, as fixed by the executive council of the State last July and now published in that body's forty-fifth annual report, total \$2,005,163 for 486.24 miles of road. The 1915 valuations for the same electric lines amounted to \$1,810,491 for 477.80 miles of road. The total taxable valuation for all the steam railroads in the State for 1916 is \$78,865,593 for 10,029.38 miles of road, as compared to a 1915 valuation of \$78,880,376 for 10,016.71 miles of road. Other 1916 valuations follow: Transmission lines, \$308,075; equipment companies, \$235,800; sleeping cars, \$430,186, and express property, \$311,653.

The detailed lengths and taxable values of Iowa interurban railroads as of Jan. 1, 1916, are shown below:

	Miles of Road	Taxable Value Per Mile	Total Taxable Value
Cedar Rapids & Marion City Railway..	21.94	\$8,500	\$186,490
Centerville Light & Traction Company..	7.84	3,500	27,440
Charles City Western Railway.....	23.35	3,500	81,725
Davenport & Muscatine Railway.....	25.27	3,500	88,445
Fort Dodge, Des Moines & Southern Railroad	117.97	3,500	412,895
Inter-Urban Railway	64.20	3,500	224,700
Iowa & Illinois Railway.....	33.05	3,700	122,285
Iowa Railway & Light Company.....	55.09	3,700	203,833
Mason City & Clear Lake Railroad....	14.62	4,500	65,790
Oskaloosa & Buxton Electric Railway..	2.30	3,700	8,510
Southern Iowa Railway & Light Company	10.00	3,000	30,000
Waterloo, Cedar Falls & Northern Railway	110.61	5,000	553,050
Total	486.24	.....	\$2,005,163

INITIAL P. R. T. DIVIDEND

The Philadelphia (Pa.) Rapid Transit Company on Sept. 20 declared an initial dividend of 2 per cent, payable on Oct. 11 to stock of record Oct. 4. Retiring directors of the Philadelphia Rapid Transit Company were re-elected at the annual meeting. The board met later and organized by re-electing the retiring officers. At the annual meeting of Union Traction Company stockholders on Sept. 20 James G. Balfour and John C. Gilpin were elected to the board to succeed George W. Elkins and Jacob S. Disston. The other directors were re-elected.

ANNUAL REPORTS

United Railways of St. Louis

The comparative income statement of the United Railways of St. Louis, St. Louis, Mo., for the six months ended June 30, 1915 and 1916, follows:

	1916	1915
Transportation revenue	\$6,163,836	\$5,717,056
Revenue other than transportation.....	47,469	45,347
Gross earnings from operation.....	\$6,211,305	\$5,762,403
Operating expenses	\$3,421,879	\$3,403,145
Depreciation	745,357	627,054
Taxes	403,734	359,111
Total	\$4,570,970	\$4,389,310
Income from operation	\$1,640,335	\$1,373,093
Miscellaneous income	50,346	48,220
Gross income	\$1,690,681	\$1,421,313
Deductions from income.....	1,282,714	1,306,193
Net income	\$407,967	\$115,120
Dividend on preferred stock.....		
Surplus	\$407,967	\$115,120

The foregoing figures are contained in a special semi-annual report to the stockholders. It is stated that as a result of the settlement of the old mill tax litigation and the payment of \$1,839,205 for the adjudicated claims, there were a number of inquiries from stockholders as to the condition of the property. The company, therefore, deemed it an opportune time to place before the stockholders a statement of present condition, while at the same time outlining the important problems confronting the company, such as in the matters of the mill tax situation, the power situation, maturing securities and new property requirements. The company's position on the power question is stated elsewhere in this issue.

The financial statement included in the report shows that the gross earnings from operation during the first six months of 1916 increased \$448,902 or 7.79 per cent as compared with those of the corresponding period last year. The operating expenses showed a net increase of \$18,733 or 0.55 per cent owing to an increase in wages and in the amount set up for damages and law expenses. The total expenses, including depreciation, increased \$137,036 or 3.4 per cent as compared with the corresponding period last year.

The income from operation, after deducting the total expenses and taxes, increased \$267,242 or 19.46 per cent as compared with the same period last year. The gross income increased \$269,367 or 18.95 per cent. The fixed charges decreased \$23,478 or 1.8 per cent owing to the retirement of Southern Railways 6 per cent bonds May 1, 1915, and the St. Louis & Meramec River Railroad 6 per cent bonds May 8, 1916, and also to the purchase of various underlying bonds. The net income, therefore, gained \$292,847 or was more than tripled.

The total number of passengers carried for the first six months of 1916 as compared with the corresponding period of 1915 was as follows:

	1916	1915
Revenue passengers, 5 cents.....	121,642,725	112,371,381
Revenue passengers, 2.5 cents.....	2,545,424	2,292,102
Total	124,188,149	114,663,483
Transfer passengers	66,312,251	60,158,867
Total passengers	190,500,400	174,822,350

The percentage of revenue passengers using transfers during the first six months of 1916 was 53.40. During the first six months of 1915 it was 52.47, an increase of 0.93 per cent.

The capital expenditures made by the company for the six months ended June 30, 1916, were as follows: Real estate, buildings, tools and fixtures, \$56,797; track and roadway construction, \$19,228; electric line construction, \$3,454, and cars and electrical equipment of cars, \$12,033; total, \$91,513.

From July 1, 1910, to June 30, 1916, there was expended on the property of the company: In maintenance, \$9,912,346; in reconstruction of property paid for out of depreciation reserve, \$5,371,879, and in construction and in betterment and improvements, \$1,528,019; total, \$16,812,246. All of this sum was paid out of the earnings of the property, and none represents money obtained from new capital issues. The total is 22.985 per cent of the gross earnings during those years. The growth of the city has been slow during

that time, and a comparatively small sum has been necessary for additional tracks and equipment. If St. Louis had grown as it did previous to that time, the report states, the earnings would not have sufficed to enable the railway to keep pace with the growth of the city.

Sooner or later, it is hoped, business conditions in St. Louis will improve, and the accompanying growth in population will require large additional capital expenditures for tracks, cars, car storage, substations, feeders and other new and additional equipment. Moreover, between the present date and October, 1924, bonds mature to the extent of \$27,448,000. The probable construction demands in the near future and these maturing bond issues, together with the burden of increased taxes, make the amounts of money available from earnings inadequate for these purposes. How these maturing bonds may be taken care of and how this additional capital may be raised is a matter of anxious concern which the management is presently considering and, it promises the stockholders, will continue to consider in the expectation of a timely solution of the problem.

The report reviews in detail the history of the mill tax litigation, which last May was finally decided against the company as to taxes from 1903 to 1910, amounting with interest to \$1,839,205. This sum was paid on June 16. The taxes from 1910 to the present time amount, with interest, to approximately \$1,500,000. No judgments have been obtained for these taxes, although suits have been filed by the city and will probably come up for trial this autumn. The report states that in justice to the interests of the stockholders, the board of directors has always felt that it was in duty bound to resist the payment of a tax which it considers excessive and illegal.

Lima Light, Power & Tramways Company

The operations of the Empresas Eléctricas Asociadas (Lima Light, Power & Tramways Company), which holds practically a monopoly of the electric railway, power, and light in Lima, Callao, and several of the suburban towns in Peru, showed a small general decrease for 1915. The bonds of this company are largely held in London, but there is also considerable local and American capital invested in it. The net profits for 1915, after setting aside the sum of \$141,129 for the amortization account and writing the sum of \$204,393 off the books against bad debts, etc., amounted to more than \$145,950, but owing to the agreement made with the bondholders in London whereby the amortization service on the bonds was suspended from June 30, 1914, for a period of two years, no dividends may be distributed from profits during this period.

The gross income for 1915 amounted to \$1,880,035 as compared to \$1,913,469 for 1914, a decrease of \$33,434. Of this amount \$836,045 represents the cost of operation during 1915, as compared to \$804,233 in 1914, an increase of \$31,812.

The gross revenues of the urban and interurban tramways in 1915 amounted to \$997,641 as compared to \$997,712 in 1914, a decrease of \$71. The cost of operation amounted to \$614,154 as compared to \$585,465 in 1914, an increase of \$28,689. The net revenue amounted to \$383,487 as compared to \$412,246 in 1914, a decrease of \$28,759. These figures represent the Lima Urban Tramway, the line from Lima to Chorillos, the Lima-Callao and Magdalena tramways. The net revenues showed a decrease in all cases except the Magdalena line, on which there was a net increase of \$8,059.

The gross revenues from freight traffic in 1915 amounted to \$131,371 as compared to \$173,971 in 1914, a decrease of \$42,600. The running expense in 1915 amounted to \$146,244, as compared to \$164,223 in 1914, a decrease of \$17,979. The net loss in 1915 was \$14,873, a decrease of \$24,620. No section of the company's service suffered a greater commercial depression than the freight lines during the last year, owing to the paralysis of the maritime movement and the decrease in the volume of imports at the port of Callao.

The total length of the company's lines is 136 kilometers. The number of interurban cars in operation was fifty-two, of urban cars seventy-five. This company uses large quantities of American electrical equipment and goods, and most of the new cars installed in recent years have been of American manufacture, especially the modern high-power cars on the suburban lines.

ELECTRIC RAILWAY STATISTICS

Returns for First Half of 1916 and 1915 Show Increased Expenses and Taxes But Higher Net

A comparison of electric railway statistics for the six months, January-June, 1916, with figures for the corresponding months of 1915, made by the information bureau of the American Electric Railway Association, indicates a noticeable improvement in the electric traction business of the United States. Data for the six months representing 7444 miles of line of companies scattered throughout the country show an increase in operating revenues of 8.08 per cent, in operating expenses of 5.68 per cent, and in net earnings of 12.10 per cent, while data representing 6391 miles of line indicate an increase in taxes of 6.58 per cent, and in operating income of 13.09 per cent. The number of revenue and transfer passengers carried by companies rep-

TABLE I—REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR JUNE, 1916

	Companies Not Reporting Taxes		Companies Reporting Taxes	
	Amount	Per Cent Increase	Amount	Per Cent Increase
<i>United States*</i>				
Operating revenues.....	\$17,683,491	9.43	\$14,655,069	8.53
Operating expenses.....	10,753,952	4.98	9,047,654	4.50
Net earnings.....	6,929,539	17.14	5,607,415	15.71
Taxes.....	.....	.....	1,006,379	16.63
Operating income.....	.....	.....	4,601,036	15.51
Operating ratio, per cent:				
1915.....	63.39	.....	64.11	.....
1916.....	60.81	.....	61.74	.....
Miles of line represented.	7,444	.....	5,955	.....
<i>Eastern District*</i>				
Operating revenues.....	\$12,712,800	11.40	\$9,947,131	10.53
Operating expenses.....	7,661,574	6.56	6,129,928	6.28
Net earnings.....	5,051,226	19.64	3,817,203	18.10
Taxes.....	.....	.....	656,928	21.71
Operating income.....	.....	.....	3,160,275	17.38
Operating ratio, per cent:				
1915.....	63.00	.....	64.09	.....
1916.....	60.27	.....	61.62	.....
Miles of line represented.	4,726	.....	3,481	.....
<i>Southern District*</i>				
Operating revenues.....	\$793,311	7.07	\$589,579	5.59
Operating expenses.....	460,024	2.19	328,647	d0.67
Net earnings.....	333,287	14.63	260,932	14.70
Taxes.....	.....	.....	49,270	9.43
Operating income.....	.....	.....	211,662	16.00
Operating ratio, per cent:				
1915.....	60.76	.....	59.26	.....
1916.....	57.99	.....	55.74	.....
Miles of line represented.	689	.....	533	.....
<i>Western District*</i>				
Operating revenues.....	\$4,177,380	4.28	\$4,118,359	4.38
Operating expenses.....	2,632,354	1.11	2,589,079	1.16
Net earnings.....	1,545,026	10.16	1,529,280	10.31
Taxes.....	.....	.....	300,181	7.93
Operating income.....	.....	.....	1,229,099	10.90
Operating ratio, per cent:				
1915.....	64.99	.....	64.86	.....
1916.....	63.01	.....	62.87	.....
Miles of line represented.	2,029	.....	1,941	.....

NOTE—Letter *d* denotes a decrease.
 *Groupings are as follows: *Eastern District*—East of the Mississippi River and north of the Ohio River, exclusive of the Greater New York. *Southern District*—South of the Ohio River and east of the Mississippi River. *Western District*—West of the Mississippi River.

representing 6587 miles of line increased 7.21 per cent, while the revenue car mileage increased 3.32 per cent. The Western District seems to share but little in the improved business conditions of the other sections of the country.

Of the three groups shown on Table II, the Western, represented by 2029 miles of line, shows an increase in operating revenue of 3.97 per cent, in operating expenses of 3.45 per cent and in net earnings of 4.94 per cent. Returns for about 97 per cent of this mileage show an increase in the amount of taxes paid of 5.07 per cent and in operating income of 4.94 per cent.

The Southern group, represented by 689 miles of line, shows an increase in operating revenue of 7.18 per cent, in operating expenses of 1.83 per cent and in net earnings of 15.82 per cent. Returns, however, for about 75 per cent of this mileage indicate a decrease in operating expenses of 1.37 per cent and increases in taxes of 9.52 per cent and in the operating income of 12.53 per cent.

The Eastern group, represented by 4726 miles of line or about 60 per cent of the total mileage, indicates an in-

TABLE II—REVENUES AND EXPENSES OF ELECTRIC RAILWAYS FOR SIX MONTHS, JANUARY TO JUNE, 1916

	Companies Not Reporting Taxes		Companies Reporting Taxes	
	Amount	Per Cent Increase	Amount	Per Cent Increase
<i>United States</i>				
Operating revenues.....	\$100,582,214	8.08	\$96,527,216	8.00
Operating expenses.....	61,644,132	5.68	59,099,293	5.66
Net earnings.....	38,938,082	12.10	37,427,923	11.91
Taxes.....	.....	.....	6,460,469	6.58
Operating income.....	.....	.....	30,967,454	13.09
Operating ratio, per cent:				
1915.....	62.68	.....	62.58	.....
1916.....	61.29	.....	61.22	.....
Miles of line represented	7,444	.....	6,391	.....
<i>Eastern District</i>				
Operating revenues.....	\$71,515,049	9.61	\$69,063,491	9.69
Operating expenses.....	43,106,096	6.78	41,640,646	6.87
Net earnings.....	28,408,953	14.22	27,422,845	14.28
Taxes.....	.....	.....	4,385,185	7.01
Operating income.....	.....	.....	23,033,660	15.78
Operating ratio, per cent:				
1915.....	61.88	.....	61.89	.....
1916.....	60.27	.....	60.29	.....
Miles of line represented	4,726	.....	3,917	.....
<i>Southern District</i>				
Operating revenues.....	\$4,603,197	7.18	\$3,262,416	3.91
Operating expenses.....	2,702,059	1.83	1,899,210	d1.37
Net earnings.....	1,900,138	15.82	1,463,206	11.67
Taxes.....	.....	.....	295,663	9.52
Operating income.....	.....	.....	1,167,543	12.23
Operating ratio, per cent:				
1915.....	61.80	.....	59.51	.....
1916.....	58.72	.....	56.48	.....
Miles of line represented	689	.....	533	.....
<i>Western District</i>				
Operating revenues.....	\$24,463,968	3.97	\$24,101,309	3.98
Operating expenses.....	15,834,877	3.45	15,559,437	3.44
Net earnings.....	8,629,091	4.94	8,541,872	4.97
Taxes.....	.....	.....	1,775,621	5.07
Operating income.....	.....	.....	6,766,251	4.94
Operating ratio, per cent:				
1915.....	65.05	.....	64.89	.....
1916.....	64.73	.....	64.55	.....
Miles of line represented.	2,029	.....	1,941	.....

NOTE—Letter *d* denotes a decrease.

crease in operating revenue of 9.61 per cent, in operating expenses of 6.78 per cent and in net earnings of 14.22 per cent. Returns representing about 83 per cent of this mileage show an increase in the amount of taxes paid of 7.01 per cent and in operating income of 15.78 per cent.

On the whole the number of passengers carried has increased, as has the number of revenue car miles run. While the Eastern District shows an increase of 8.35 per cent in the number of passengers carried and one of 3.40 per cent in the number of car miles run, the Southern shows an increase of 11.23 per cent in the number of passengers and an increase of 5.66 per cent in the number of car miles. The increases in the Western district have been the smallest of the three groups shown—the number of passengers increasing but 4.41 per cent and the number of car miles run 2.81 per cent. All of the districts show a decrease in the operating ratio, the United States as a whole indicating a decrease from 62.68 in 1915 to 61.29 in 1916. The operating ratio of the Western district is higher than those of the other districts and has decreased least of all.

The returns for June shown in Table I indicate a considerable improvement over a similar comparison for the

TABLE III—TRAFFIC AND OPERATING STATISTICS OF ELECTRIC RAILWAYS FOR SIX MONTHS, JANUARY TO JUNE, 1916

	Revenue and Transfer Passengers		Revenue Car Mileage		Miles of Line Represented		Operating Revenues Per Revenue Car Mile (cents)*		Operating Expenses Per Revenue Car Mile (cents)*		Net Earnings Per Revenue Car Mile (cents)*	
	Amount	Per Cent Increase	Amount	Per Cent Increase	Amount	Per Cent Increase	Per Cent		Per Cent		Per Cent	
							Amount	Increase	Amount	Increase	Amount	Increase
United States.....	2,026,275	7.21	277,380	3.32	6,587	...	28.99	4.02	18.50	1.98	10.49	7.81
Eastern district.....	1,342,134	8.35	176,881	3.40	4,214	...	30.40	5.34	19.29	2.71	11.11	10.22
Southern district.....	66,782	11.23	13,154	5.66	413	...	21.51	3.86	13.48	d2.67	8.03	17.05
Western district.....	617,359	4.41	87,345	2.81	1,960	...	27.27	1.30	17.67	1.03	9.60	1.80

NOTE—Letter *d* denotes a decrease. †The last three figures are omitted.
 *The figures in these columns are based upon the revenue car mileage shown in this table. As some of the companies reporting do not show car mileage, however, the returns from those only showing both car mileage and revenues, expenses, etc., have been used in arriving at the above shown figures.

previous month, though, of course, they are not strictly comparable because of the difference in the miles of line represented. Table III shows that the net earnings per revenue car mile for the United States as a whole have increased 7.81 per cent, while those of the Western District have increased but 1.80 per cent. Companies numbering 104 reported for Table II.

American Railways, Philadelphia, Pa.—Bioren & Company, Philadelphia, Pa., are offering at prices to yield 5 per cent and 5½ per cent \$140,000 of car trust 5 per cent certificates Series C issued by the American Railways under the Philadelphia plan. The certificates are dated Aug. 1, 1916, and mature \$11,000 on Aug. 1, 1917, to 1920, inclusive, and \$12,000 on Aug. 1, 1921, to 1928, inclusive.

Brockton & Plymouth Street Railway, Brockton, Mass.—The directors of the Brockton & Plymouth Street Railway voted to defer the payment of the semi-annual dividend of \$3 per share, normally payable on Sept. 15, on the cumulative preferred stock of the company.

Connecticut Company, New Haven, Conn.—Clark, Dodge & Company, New York, N. Y., and Hartford, Conn., are offering for subscription \$460,000 of Connecticut Company 4½ per cent gold equipment notes, dated Sept. 15, 1916, and due \$46,000 semi-annually March 15 and Sept. 15, 1917 to 1921. The trustee of the indenture securing the notes is the Security Trust Company, Hartford.

Kansas City (Mo.) Railways.—The directors of the Kansas City Railways have authorized the trustees of the company to pay 2½ per cent on the preferred beneficial certificates of the Kansas City Railways. The dividend will be paid on Oct. 1, which puts the preferred beneficial certificates on a 5 per cent basis, as it is expected that another 2½ per cent dividend will be declared in six months.

United Railways, St. Louis, Mo.—A committee of stock holders of the United Railways of St. Louis has created an independent proxy committee for the purpose of trying to get representation on the board of directors. The members of the proxy committee are August Heckscher, New York; Charles S. Farnum, Philadelphia, and Ephraim Caplan, St. Louis. The committee has sent letters to all stockholders of the company, asking them to sign proxies authorizing the committee to make such investigations and take such action as may be necessary.

Toledo Traction, Light & Power Company, Toledo, Ohio.—Assents representing more than 75 per cent of the \$6,738,500 outstanding preferred and \$7,821,900 outstanding common stocks of the Toledo Traction, Light & Power Company having been received by Henry L. Doherty & Company, depository, by Sept. 15, the plan for exchange into Cities Service Company stocks was duly declared operative. The first dividend on the Cities Service securities issued in the exchange will be the regular monthly one on Nov. 1.

Public Service Corporation of New Jersey, Newark, N. J.—Stockholders of the Public Service Corporation of New Jersey of record Oct. 2 will have the right to subscribe to \$5,000,000 of new stock at par. Negotiable certificates of allotment, authorizing subscriptions to the extent of 20 per cent of present holdings, will be sent out to stockholders on Oct. 6. The stock taken may be paid for by Jan. 2, when the stock will become entitled to dividends, or by Nov. 1, in which event 5 per cent interest to Dec. 31 will be given. Recently stockholders ratified an increase of \$25,000,000 in the company's capital stock and the issue about to be made, which will raise the amount outstanding to \$30,000,000, is part of the enlargement.

Youngstown & Suburban Railway, Youngstown, Ohio.—The Youngstown & Suburban Railway has been authorized by the Ohio Public Utilities Commission to issue its common capital stock of the par value of \$350,000, its 6 per cent cumulative preferred capital stock of the par value of \$500,000 and its first mortgage 5 per cent twenty-year gold bonds of the principal sum of \$700,000, the stock and bonds to be delivered to J. W. Blackburn, acting for and on behalf of the bondholders' protective committee of the Youngstown & Southern Railway. The securities are to be delivered in payment for the property heretofore owned and operated by the Youngstown & Southern Railway and purchased at judicial sale by Mr. Blackburn on behalf of the

bondholders' protective committee, for the payment by Mr. Blackburn of the floating indebtedness of the Youngstown & Southern Railway, with interest to Oct. 1, 1916, \$136,000; for the payment of the indebtedness to the International Trust Company, Boston, Mass., with interest to Oct. 1, 1916, \$26,000; for expenses and allowances to the bondholders' protective committee, \$10,000; and for additions, extensions and improvements costing approximately \$30,000.

DIVIDENDS DECLARED

- Asheville Power & Light Company, Asheville, N. C., quarterly, 1¾ per cent, preferred.
- Capital Traction Company, Washington, D. C., quarterly, 1¼ per cent.
- Carolina Power & Light Company, Raleigh, N. C., quarterly, 1¾ per cent, preferred.
- Cleveland (Ohio) Railway, quarterly, 1½ per cent.
- Columbus Railway, Power & Light Company, Columbus, Ohio, quarterly, 1½ per cent, preferred Series A.
- Eastern Power & Light Company, New York, N. Y., quarterly, 1¾ per cent, preferred.
- Halifax (N. S.) Electric Tramways, quarterly, 2 per cent.
- Honolulu Rapid Transit & Land Company, Honolulu, Hawaii, quarterly, 2 per cent.
- Houghton County Traction Company, Houghton, Mich., 3 per cent, preferred.
- Illinois Traction Company, Peoria, Ill., quarterly, 1½ per cent, preferred.
- Manila Electric Railroad & Lighting Corporation, Manila, P. I., quarterly, 1½ per cent.
- New York State Railways, Rochester, N. Y., quarterly, 1¼ per cent, common and preferred.
- Northern Ohio Traction & Light Company, Akron, Ohio, quarterly, 1½ per cent, preferred.
- Philadelphia Company, Pittsburgh, Pa., \$1.50 on 6 per cent preferred; quarterly, 87½ cents, common.
- Toronto (Ont.) Railway, quarterly, 2 per cent.
- Washington, Baltimore & Annapolis Electric Railroad, Washington, D. C., quarterly, 1½ per cent, preferred.
- Western Ohio Railway, Lima, Ohio, quarterly, 1¾ per cent, first preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

AURORA, ELGIN & CHICAGO RAILROAD, WHEATON, ILL.						
Period		Operating Revenue	Operating Expenses	Operating Income	Fixed Charges	Net Income
1m., July, '16		\$209,030	*\$129,436	\$79,594	\$36,117	\$43,477
1 " " '15		187,488	*120,725	66,763	36,531	30,232
BROCKTON & PLYMOUTH STREET RAILWAY, PLYMOUTH, MASS.						
1m., July, '16		\$15,256	*\$9,795	\$5,461	\$1,109	\$4,352
1 " " '15		15,346	*8,457	6,889	1,185	5,704
12 " " '16		118,790	*102,389	16,401	13,244	3,157
12 " " '15		118,618	*98,264	20,354	13,585	6,769
CAPE BRETON ELECTRIC COMPANY, LTD., SYDNEY, N. S.						
1m., July, '16		\$32,858	*\$19,171	\$13,687	\$6,559	\$7,128
1 " " '15		31,319	*17,666	13,653	6,602	7,051
12 " " '16		383,240	*224,907	158,333	78,568	79,765
12 " " '15		338,022	*206,228	131,794	78,803	52,991
PENSACOLA (FLA.) ELECTRIC COMPANY						
1m., July, '16		\$20,964	*\$12,076	\$8,888	\$7,712	\$1,176
1 " " '15		21,940	*12,626	9,314	7,123	2,191
12 " " '16		276,272	*153,426	122,846	89,311	33,535
12 " " '15		246,080	*150,518	95,562	86,948	8,614
PHILADELPHIA (PA.) RAPID TRANSIT COMPANY						
1m., Aug., '16		\$2,149,836	\$1,223,473	\$926,363	\$815,011	\$111,352
1 " " '15		1,897,763	1,086,744	811,019	815,941	74,922
2 " " '16		4,364,765	2,444,948	1,919,817	1,630,279	289,538
2 " " '15		3,837,669	2,182,439	1,655,230	1,632,538	22,692
REPUBLIC RAILWAY & LIGHT COMPANY, YOUNGSTOWN, OHIO						
1m., Aug., '16		\$335,578	*\$183,147	\$152,431	\$72,436	†\$82,371
1 " " '15		260,792	*158,289	102,503	56,922	†45,725
8 " " '16		2,596,204	*1,523,451	1,072,753	555,831	†521,168
8 " " '15		1,968,618	*1,218,582	750,036	446,846	†304,262
SAVANNAH (GA.) ELECTRIC COMPANY						
1m., July, '16		\$69,445	*\$45,193	\$24,252	\$23,705	\$547
1 " " '15		67,284	*44,305	22,979	23,275	†296
12 " " '16		791,697	*532,425	259,272	280,073	†20,801
12 " " '15		806,732	*522,568	284,164	277,688	6,476
TAMPA (FLA.) ELECTRIC COMPANY						
1m., July, '16		\$74,625	*\$41,162	\$33,463	\$4,396	\$29,067
1 " " '15		78,979	*41,456	37,523	4,364	33,159
12 " " '16		970,873	*519,362	451,511	52,287	399,224
12 " " '15		982,095	*504,183	477,912	52,744	425,168

*Includes taxes. †Deficit. ‡Includes non-operating income.

Traffic and Transportation

INSURANCE FOR HUDSON TUBE EMPLOYEES

Hudson & Manhattan Railroad, Operating Under River Tunnels, Announces Terms of Group Insurance for Employees

In recognition of the faithful and loyal services of the officers and employees of the Hudson & Manhattan Railroad, New York, N. Y., and for the purpose of furthering the common interests of the company and its employees, the directors upon the recommendation of the president, have approved a plan of life insurance for the benefit of those employees who while in the company's service may die or become totally disabled. This life insurance supersedes the employees' death benefit fund, and became effective on Sept. 1, 1916. The general features of the life insurance plan are as follows:

1. The premium to be paid by the company, making the insurance without cost to the employees.

2. Every employee in the service on Sept. 1, 1916, is included in the plan.

3. All employees who on Sept. 1, 1916, have been continuously in the company's service three years or longer are included for full benefits as follows:

(a) Employees receiving rates of wages of \$2.51 or over a day, are insured for the amount of \$1,000.

(b) Employees receiving rates of wages of \$2.01 to \$2.50 a day, are insured for the amount of \$750.

(c) Employees receiving rates of wages of \$2 or less a day, are insured for the amount of \$500.

4. All employees who on Sept. 1, 1916, have been continuously in the company's service less than three years are included for half benefits as follows:

(a) Employees receiving rates of wages of \$2.51 or over a day, are insured for the amount of \$500.

(b) Employees receiving rates of wages of \$2.01 to \$2.50 a day, are insured for the amount of \$375.

(c) Employees receiving rates of wages of \$2 or less a day, are insured for the amount of \$250.

5. All employees who are now entitled to half benefits will automatically become entitled to full benefits as soon as their three years of service are completed.

6. New employees entering the company's service after Sept. 1, 1916, will be required to complete one year's full service before they become entitled to participate in this life insurance plan. After having served one full year, such employees will be entitled to half benefits during the next two years of service, and having completed three full years of service (one year without benefits plus two years with half benefits), such employees will automatically become entitled to full benefits under the insurance plan as it has been decided upon.

7. All employees in the service on Sept. 1, 1916, will be included in the life insurance plan whether for full benefits or for half benefits, without any medical examination. As to new employees entering the service after Sept. 1, 1916, the regular physical examination by the company's medical officer will be accepted as sufficient medical examination under the insurance plan.

8. With the approval of the company, and contingent upon loyal service, employees may take out additional insurance at their own expense equal to that for which they are insured by the company. This additional insurance will be granted without further medical examination and at the same group rates paid by the company. Upon favorable terms still larger amounts of insurance may be secured by any employee who may desire it.

9. If and when any employee for any cause leaves the company's service all insurance benefits cease and terminate; but with the approval of the company, and contingent upon loyal service, employees when leaving the service may convert their policies secured under this life insurance plan into regular life or endowment policies without further medical examination and at the customary rates for this class of insurance sick.

NEW JITNEY RULES FROM MARYLAND

The Public Service Commission of Maryland has drawn up a new set of rules for jitney buses, to become effective on Oct. 1, in place of the regulations issued on June 19, 1915. The new rules are designed not merely to control the jitney traffic, but to standardize it so far as possible. The rules provide that no motor car may be used in the public transportation of persons or freight until a permit shall have been obtained from the commission. Every permit, no matter when issued, shall terminate as of Dec. 31 following. The commission may specify in the permits the rates that are to be charged and may require the owners to post in the cars a schedule of such rates.

No motor car for which a fixed route or a fixed schedule has been made shall vary from it without the permission of the commission, except in emergency. All cars operating over fixed routes, or between fixed terminals, shall carry destination signs, which shall indicate the terminals or the streets which form the greater part of the route.

Cars operated for hire other than over a fixed route shall carry a sign designating them as "hiring cars." They may not operate over the fixed route of any other jitney or jitney concern, nor solicit passengers or freight along any fixed route without being required to obtain from the commission permits as buses engaged in traffic over fixed routes.

Not more than one person, in addition to the driver, shall be permitted to occupy the front seat; no passenger shall be permitted to ride on the steps or running board, and no person shall ride on the top unless it has been constructed for such use and is equipped properly with seats and rail protection.

Cars may not carry more than one passenger for each 16 in. of seating space, and that allowance per passenger is conditioned upon an average weight of not more than 140 lb. per passenger. The commission states in the rules the following as the greatest loads that may be carried:

Total length seats.	128	140	166	176	192	208	234	240
Pounds capacity...	1,120	1,260	1,400	1,540	1,680	1,820	1,960	2,150
Number passengers.	8	9	10	11	12	13	14	15

The rules further provide that accidents and interruptions to service must be reported to the commission; that owners of jitneys may not withdraw them from service without at least ten days' notice to the commission; that sufficient reserve equipment must be kept to maintain service on fixed routes and schedules, and that jitneys must be kept in such condition that adequate service will be rendered and the public and passengers not endangered by avoidable breakdowns.

REASONS FOR FAVORABLE DECISION IN BRISTOL & NORFOLK CASE

In the ELECTRIC RAILWAY JOURNAL of Sept. 9, page 469, reference was made to the authorization of a proposed fare increase to 6 cents on the Bristol & Norfolk Street Railway by an order of the Massachusetts Public Service Commission dated Aug. 31. The decision of the board in this case was based upon a finding that the property is clearly a losing venture; that its physical condition is poor, and that the company is justly entitled to a larger revenue if it can be secured. In 1914 the road failed to earn operating expenses by \$2,077, and in 1915 by \$539. The commission finds that as the owners have abandoned the track formerly belonging to the Easton Street Railway, the former are not entitled to a return upon the capitalization representing the portion so abandoned, but allowance for this makes no difference in the company's being entitled to additional revenue. The company operates only 6.696 miles of single track, of which it owns 6.318 miles. Its capital stock totals \$100,000, the funded debt being \$70,000; unpaid interest totals \$42,000, and there is a profit and loss deficit of \$54,925. The road at present runs from Stoughton Square to Randolph, and the combined population served was only 12,223 in 1915. In the thirteen fiscal years from 1903 to 1915 inclusive the company failed to earn its fixed charges.

Practically the only objection raised by the remonstrants was to the elimination of a special arrangement under which a lower fare is granted to workmen at certain hours of the day. The company proposed to increase this fare from

5 cents to 12 cents, and the commission pointed out that this might lay a heavy burden upon certain families. The company showed that only seventy to seventy-five persons a day avail themselves of this special rate. The decision says:

"While the commission doubts its authority to require the company to maintain special reduced rates similar to those now in force, it feels that the company, in the exercise of sound discretion in management, ought to consider very carefully the change which is proposed. The result, if this policy is carried out, might well be to compel certain families to change their place of residence, so that the actual net gain for the company would be insignificant. We strongly urge the company to consider the desirability of a less radical change. An increase in the present rate during these hours from 5 to 7 cents would, we think, be likely to produce better results for the public and the company."

Hearing on Berkshire Operation.—The Massachusetts Public Service Commission has assigned Oct. 3 as the probable date for a hearing upon the petition of the towns of Westfield, Lee, Huntington and others, urging that the Berkshire Street Railway be compelled to inaugurate service over the entire line lately completed between Lee and Huntington. At present service is rendered from Lee to a point in Otis.

Get Passengers to Unfold Their Transfers.—The Portland Railway, Light & Power Company, Portland, Ore., has effected a notable saving of conductors' time by requesting passengers to unfold their transfers before presenting them on entering the prepayment type cars. The request has been made through *Watts Watt*, the company's weekly leaflet which conductors hand out to passengers. Evidence that passengers read and heed is given by the fact that conductors report much more attention to this detail, and in some instances passengers have commented on the notices which appeared requesting it.

Jitney Men Comply with Wilkes-Barre Ordinance.—Convinced that the only way jitneys can operate in Wilkes-Barre, Pa., is to meet full requirements of the jitney ordinance, eleven men who have been engaged in the business since the strike of the employees of the Wilkes-Barre Railway, filed the required \$2500 bond on Sept. 13, had their cars inspected and underwent physical examinations as the first step in restoring jitney travel. Other jitney men are expected to comply with the ordinance, now that it has been definitely determined that Council will not revise or repeal the ordinance in part or in whole.

Owl Traffic Falls Off When State Goes Dry.—On fourteen lines of the Portland Railway, Light & Power Company, Portland, Ore., which serve residence districts of the city, there has been a material decrease of owl traffic since the prohibition law went into effect. This decrease has ranged from 24 to 31 per cent, according to the class of district involved, the average being 28 per cent. This has been accompanied by a slight increase of traffic in the late evening hours. One explanation offered is that the 28 per cent of owl car patronage was saloon attendants and patrons who have left the dry town or who now go home early.

Accident in Pennsylvania Railroad Tube.—Fourteen persons were injured when two trains tried to enter the single-track westbound tube of the Hudson River tunnel system beyond the Pennsylvania Station in New York at the same time on Sept. 16. It was the first accident to happen at the Pennsylvania Station since it was opened six years ago, and the first serious mishap the Pennsylvania has ever had with its tube operation. The Washington Express started out at 10.08 o'clock. It consisted of an electric locomotive and six cars. Two minutes later electric locomotive No. 27 struck the Washington train just between the diner and the first day coach.

New Traffic Ordinance in Portland, Ore.—By unanimous vote of the Council of Portland, Ore., a new traffic ordinance has been passed and will go into effect by Oct. 1. The ordinance provides that street cars shall stop at the near instead of far crossing on all paved streets; that no vehicle shall pass either to the right or left of a street car which is standing at an intersection to take on or discharge passengers; that no transparency or sign larger than 36-in. square shall be carried or moved in the downtown streets;

that the speed of automobiles within the congested district shall be not more than 15 m.p.h. and outside this district 20 miles; that fire apparatus and all other emergency vehicles shall be limited in speed to 25 m.p.h.

Blanket Jitney Grant Wanted.—S. Chaimov recently petitioned the City Council of Portland, Ore., for a blanket franchise covering the entire city for the operation of jitneys, for a period of twenty-five years. For the first year he is willing to pay the same amount of revenue the city is now receiving from the jitneys; for the second, third, fourth and fifth years, he will increase the amount \$500 a year, and \$1,000 a year for each year up to the tenth. For the next seven and one-half years he agrees to pay \$10,000 and for the rest of the time \$12,000. It is probable that the City Council will consider the application along with the application of the Jitney Drivers' Union, which recently applied for a term franchise.

Prize Stock Handled at Louisville.—The Louisville & Interurban Railroad, Louisville, Ky., has closed a considerable amount of desirable business in the way of transportation of high bred live stock from stock farms in Shelby County, some 30 miles out, to the State Fair grounds in Louisville, Ky. A year ago the company transported the show herd of Jerseys from one of the breeding farms near Shelbyville, terminus of one of the country lines. These were all valuable animals and the trip is always dreaded by the owner. Three hours after being loaded, they had been led from the car, and were safe in the show pens. The same time was made on the return trip. This year, without solicitation, the company increased this kind of business on the strength of the Jersey breeder's recommendation, giving a service with which the steam roads could not compete. The shippers did not think it necessary to take out any insurance on the animals handled by electric cars. The usual baggage cars were used for this work, bedded in straw, and a portable chute was used in unloading at the fair grounds.

Safety Zones Opposed in Buffalo.—Thomas Penney, general counsel of the International Railway, Buffalo, N. Y., appeared in opposition to the establishment of safety zones in the down-town streets of the city at a hearing before the Commissioner of Public Works. The Automobile Club is fostering a movement to abolish the ordinance which requires all automobiles to stop to the rear of street cars when passengers are boarding or alighting and is urging the establishment of safety zones where passengers may wait for cars. Mr. Penney said that the only question was whether safety zones would facilitate the movement of automobiles or street car traffic. If it was proposed to abolish the present ordinance requiring automobiles to stop to the rear of standing street cars, he objected to the proposed plan. Not a person has been killed in the down-town section since the present ordinance has been effective. Mr. Penney also pointed out that 90 per cent of the traffic on the Buffalo city lines came into the down-town center during the rush hour period because of the peculiar layout of the district and that automobile drivers must be checked from fast driving.

Decision Reserved in Point Shirley Fare Case.—The Public Service Commission of Massachusetts has issued a memorandum withholding decision in the petition of patrons of the Boston, Revere Beach & Lynn Railroad for the establishment of a 5-cent fare via the Narrow Gauge line and Point Shirley Street Railway, between Rowes Wharf, Boston, and Point Shirley. The Revere Beach company owns the stock of the street railway and a motor-car service is operated over the track of the latter in connection with the through train service on the former. The petitioners urged that the service be improved and the rates reduced. The commission notes that the company has given assurances that track defects will be remedied and more reliable service rendered in the coming winter and places this part of the case on file. In view of the fact that the petitioners and the Selectmen of Winthrop were not in agreement at the hearing as to the expediency of reducing the fares on the street railway, the commission has laid the petition upon the table. At the hearing, the Selectmen contended that a reduction in fares would result in a depreciation of real estate value in the territory served.

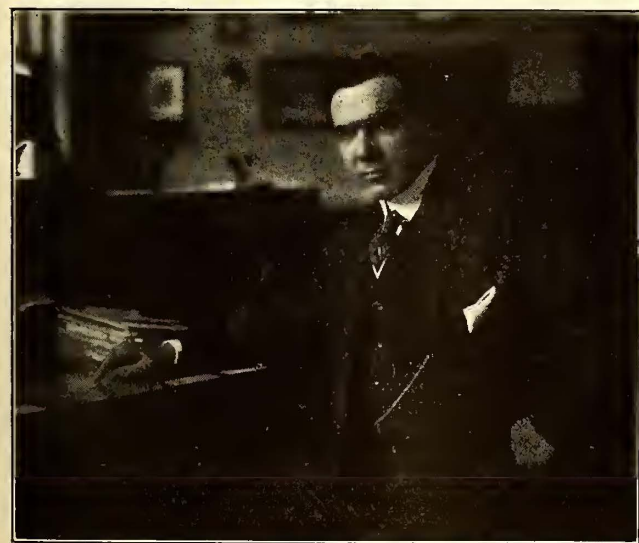
CHANGES IN BOSTON PERSONNEL

Matthew C. Brush Elected President of the Boston Elevated Railway, General Bancroft Becomes Chairman of the Board of Directors

The directors of the Boston (Mass.) Elevated Railway elected Matthew C. Brush president and a director of the company at a special meeting on Sept. 15. Maj.-Gen. William A. Bancroft, retired, who has been president of the road since 1899, was elected chairman of the board. The change went into effect immediately. Both men have had distinguished careers in the transportation industry. Mr. Brush becomes executive head of the company at the age of thirty-eight, and is one of the most widely-known operating officers in the country. General Bancroft's name has been synonymous with the development of the Boston system from that of horse car days to its present magnitude, and his able administration of the property has earned widespread commendation.

Matthew Chauncey Brush was born in Stillwater, Minn., in 1877. He was graduated from the Armour Institute of Chicago in 1897 and in 1901 from the Massachusetts Institute of Technology. His early work included a broad steam railroad and steamship experience in the Middle West and Great Lakes districts. Mr. Brush served as machinist, foreman and roundhouse foreman for the Union Pacific Railroad at Omaha, Neb.; as purser on Great Lakes steamers, and then as general foreman in charge of shops and roundhouses on the Chicago, Rock Island & Pacific Railroad. Thirteen years ago he entered the street railway field as assistant to the president of the Boston Suburban Electric Companies, with headquarters at Newtonville, soon becoming general manager and vice-president. While connected with this property Mr. Brush was directly in charge of the campaign for the substitution of the present 6-cent fare unit for the 5-cent rate formerly standard on the road, and the success of the general program was important in relation to later developments in this field under the regulative authority of the Massachusetts Public Service Commission.

In 1909 Mr. Brush resigned to become general manager of the Buffalo & Lake Erie Traction Company, the Jamestown, Chautauqua & Lake Erie Railroad, and the Jamestown & Chautauqua Steamship Company, operating 200 miles of electric lines, 50 miles of steam railroad and a fleet of steamboats on Lake Chautauqua, N. Y. In 1910 he entered



MATTHEW C. BRUSH

the service of the Boston Elevated Railway as assistant to the vice-president. In 1911 he became chairman of the company's efficiency committee, and in 1912 was made second vice-president, later being appointed vice-president, in direct charge of the bureau of transportation. Mr. Brush's success in the field of public relations has been fully equalled in the difficult sphere of labor negotiations, and he is an exponent of the policy of entire frankness in dealing with the

public, officials and employees. He has to an unusual degree the capacity for stimulating enthusiastic and loyal service among his subordinates. Mr. Brush takes office at a time when the burdens laid upon the company by the public and by increased costs of operation have become so heavy as to necessitate an inquiry into its financial problems by a special legislative committee, and he has been closely associated with the preparation of the company's case from the standpoint of securing additional net revenue for presentation at forthcoming hearings. Mr. Brush is unmarried. He resides with his mother in Allston. He is a past-president of the New England Street Railway Club and of the American Electric Railway Transportation & Traffic Association; is a member of the Engineers' Club of Boston, the University and City Clubs of Boston, and other organizations.



MAJ.-GEN. W. A. BANCROFT

Chairman Bancroft was born at Groton, Mass., in 1855, and was graduated from Harvard College in 1878. In college he was captain and stroke of the victorious Harvard crews of 1877, 1878 and 1879, and later coached various crews for about five years. After a course at the Harvard Law School he was admitted to the bar and practised law until 1885, when he became superintendent of the Cambridge Horse Railroad, which later absorbed the Charles River Street Railway. In 1887 a strike occurred on the road, which had 600 employees, and with 1600 horses to care for and a staff of only eight persons, he achieved distinction by keeping the cars running except for three days. Later nearly all the striking employees individually admitted that their course was ill-advised. When the West End Street Railway absorbed the street railways of Boston, General Bancroft was appointed roadmaster of the system and superintended the construction of the first electric lines, under the presidency of Henry M. Whitney.

In 1890 General Bancroft resumed the practice of law, and beginning in 1892 served four successive terms as Mayor of Cambridge. At the organization of the Boston Elevated Railway he was made counsel and then vice-president and a director of the company, and upon the retirement of President William A. Gaston he became chief executive. He has been chairman of the executive committee of the board of directors for many years. Under his presidency the system has developed until it has a present investment of about \$116,000,000, 9,000 employees and 520 miles of track. The investment at the beginning of operation was approximately \$26,000,000. The retiring president has long realized the difficulty of meeting the increasing financial burdens imposed upon the company by the public in the shape of investments in new subways and rapid transit lines and has constantly encouraged the use of more efficient operating methods. His appearances before legislative committees and on occasion at commission hearings have been most illuminating to students of the problems of urban transportation. Few executives have given more unstintedly of their time to the properties under their charge. General Bancroft's interest in the physical condition of the system and in the actual handling of its operating problems has been proverbial, and for many years he has devoted virtually seven days a week to the duties of his office, including frequent and comprehensive inspection trips. In the course of his presidency General Bancroft visited numerous cities in Europe and America in the interest of comparing methods on both sides of the Atlantic.

General Bancroft was the only man in the United States at the outbreak of the Spanish-American War to receive a brigadier-general's commission, with the exception of officers of the regular army, active or retired, and of Civil War veterans. His military career began in 1875 as a private in the Fifth Massachusetts Volunteer Infantry, and after passing through the intermediate grades he became Brigadier-Gen-

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eral in 1897. In 1898 he was in command of a brigade of volunteer regiments from Illinois, Wisconsin and Iowa, with headquarters at Jacksonville, Fla., and resigned his commission at the cessation of hostilities. He was retired with the rank of Major-General of the Massachusetts Volunteer Militia in 1901.

General Bancroft was chairman of the Republican State Committee in 1893. He is a member of the Order of Cincinnati, Order of Foreign Wars, and Order of the Spanish War. He has been a director of the Boston Chamber of Commerce, and is vice-president of the Chelsea Trust Company, being a director in that organization and also in the Puritan and the United States Trust Companies, Boston. He resides in Cambridge.

In referring to the election of President Brush, the Boston *Herald* said, editorially:

"Other street railway systems have often tried to lure Matthew C. Brush away from the Boston Elevated Railway, with offers of higher salaries. His advance to the presidency of that great company thus comes in fitting recognition, not only of brilliant and faithful work, but of a certain loyalty to Boston and the company with which he has been pleasantly associated since 1909. Congratulations to him and to the public."

Personal Mention

H. C. Walters, who has been secretary and treasurer of the Nashville Railway & Light Company, Nashville, Tenn., for the last eight or nine years, has resigned to enter the newspaper business.

J. G. Phillips, assistant general superintendent of the Michigan Railway, Jackson, Mich., has resigned. He is succeeded by Horace E. Allen, as mentioned in the *ELECTRIC RAILWAY JOURNAL* Sept. 9.

D. T. Nixon, assistant general manager of the Wisconsin Public Service Company, at Green Bay, has been promoted to the position of general manager of the same company for the properties at La Crosse.

J. R. Empey, superintendent of the Elmira, Corning & Waverly Railroad, Corning, N. Y., has been appointed general manager of that company and of the Corning & Painted Post Street Railway to succeed E. W. Underwood, resigned.

E. W. Underwood, general manager of the Corning & Painted Post Railway and the Elmira, Corning & Waverly Railroad, Corning, N. Y., has resigned to accept the position of superintendent and manager of the Buffalo division of the Erie Railroad at Buffalo, N. Y.

J. A. Wilcox, who has been superintendent and master mechanic of the Corning & Painted Post Street Railway, Corning, N. Y., has been appointed superintendent of power stations and equipment of the Corning & Painted Post Street Railway and the Elmira, Corning & Waverly Railroad at Corning, N. Y.

Ernest Asher has been appointed supervisor of the sixth division of the United Railways, St. Louis, Mo. Mr. Asher was born near Salem, Mo., on July 30, 1886, and worked on his father's farm until March, 1911, when he went to St. Louis and obtained employment with the United Railways as a motorman on the Wellston line. He was frequently appointed to do relief work as a supervisor during the vacation period.

George K. Weeks has resigned from the presidency of the San Francisco-Oakland Terminal Railways, Oakland, Cal., to accept the position of president of the National City Company of California, organized to succeed N. W. Halsey & Company, investment bankers, in California. Mr. Weeks will remain on the directorate of the railways company and on the executive committee of the board. His successor as president of the railway has not yet been named.

C. E. Lenhart has been appointed master mechanic of the London & Port Stanley Railway, London, Ont. Mr. Lenhart has been engaged in electric railway work since 1888. Among the electric railways with which he has been con-

nected are the Fitchburg & Leominster Street Railway, Fitchburg, Mass.; Mahoning & Shenango Railway & Light Company, Youngstown, Ohio; Buffalo & Lake Erie Traction Company, Buffalo, N. Y., and the Lehigh Valley Transit Company.

John P. Rice has been appointed superintendent of the fourth division of the United Railways, St. Louis, Mo. Mr. Rice was born in St. Louis on Feb. 5, 1867. He entered the service of the United Railways as a conductor on the Cherokee line in 1897. After five years on this run he was appointed foreman of the Jefferson and Geyer carhouse. Two years later, desiring to be outdoors more of the time, he obtained a transfer, being appointed a supervisor. At first he was stationed on his old line, the Cherokee, later on the Bellefontaine, and in 1901 he went to the Wellston, where he remained until his appointment to succeed Superintendent Leslie, deceased, of the Broadway. After his elevation to supervisor, Mr. Rice, during his spare time, "broke in" as a motorman.

Roy Clark, formerly general foreman of the shops of the Terre Haute, Indianapolis & Eastern Traction Company at Lebanon, Ind., has been appointed master mechanic at the shops of the Michigan Railway at Kalamazoo, Mich. Mr. Clark began work in the electric railway field in 1901 as division master mechanic in the shops of the Union Traction Company of Indiana at Tipton. He continued in this company's employ for four and a half years, and since that time has held similar positions with the Chicago & Milwaukee Electric Railroad; Indianapolis, Columbus & Southern Traction Company; Indianapolis, Crawfordsville & Western Railway; Chicago, South Bend & Northern Indiana Traction Company, and the Terre Haute, Indianapolis & Eastern Traction Company where he served for five years.

Charles S. Thrasher has been elected president of the Youngstown & Ohio River Railroad, Leetonia, Ohio, to succeed Will Christy, deceased. Mr. Thrasher has been connected, for a number of years, in an official capacity with the Cleveland Construction Company, founded by Mr. Christy in the early nineties. The company so formed was a pioneer in the engineering and construction of interurban electric railroads and designed, built and equipped several hundred miles of electric railway throughout the country. Mr. Thrasher was connected with the construction of the Richmond & Petersburg Electric Railroad, the Western Ohio Railroad, the Springfield & Xenia Railway and the Mesaba Railway, and had full charge of the construction of the electric properties on Long Island, known as the New York & Long Island Traction System. After completion of the construction of the Long Island properties, he had charge of the operation of the lines as vice-president and general manager, until they were sold to the Pennsylvania Railroad interests. On his return to Ohio from Long Island, Mr. Thrasher took charge of the construction of the Youngstown & Ohio River Railroad, and since its completion, as secretary and treasurer of the company has directed its operation under Will Christy, the president, whom he now succeeds. Mr. Thrasher was appointed receiver of the properties of the Interurban Railway & Terminal Company, Cincinnati, on Oct. 1, 1914, and has reconstructed the property, under receivership, and directed its operation since that date. In addition he is an officer and director of the Springfield & Xenia Railway and in charge of operation, and is an officer and director of the Warren Bicknell Company, Cleveland, Ohio, operating managers of several interurban electric properties in various States.

OBITUARY

Charles E. Thomas, master mechanic for the Connecticut Company at Waterbury, Conn., died at the Waterbury Hospital on Sept. 12 after an illness of several weeks. Mr. Thomas was forty-seven years of age. He was a native of Maryland. He had long been engaged in electric railway work and for a number of years was connected with the street railway systems in New York City. In 1905 he entered the employ of the Connecticut Company and was assigned to lines of that company at Pittsfield, Mass. He remained in Pittsfield two years and in 1907 was transferred to Waterbury as master mechanic of the lines centering in that city. Mr. Thomas is survived by his widow and three children, the oldest of whom is fifteen years of age.

Construction News

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

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

FRANCHISES

St. Cloud, Fla.—The citizens of St. Cloud have voted to grant a franchise in St. Cloud to the Central Florida Interurban Railway. William Hall, St. Cloud, secretary. [Aug. 26, '16.]

Cumberland, Md.—The Cumberland Electric Railway has received a franchise from the Council to extend its line to the western end of the city limits, reaching a new residential section.

New Lebanon, N. Y.—The Albany Southern Railroad has received a franchise from the Council to supply electricity to the town of Lebanon. This extension will carry the company's system to the Massachusetts line.

Amanda, Ohio.—The Scioto Valley Traction Company has asked the Council for a twenty-five year franchise to supply electricity in Amanda. The company also proposes to furnish electricity to farmers residing along the line.

Honey Brook, Pa.—Application to the City Council for a franchise in Honey Brook has been made by the promoters of the proposed line from Modena to Coatesville. A franchise has been granted by the Council of Coatesville. H. G. Rambo, Coatesville, is interested. [July 29, '16.]

TRACK AND ROADWAY

Montgomery Light & Traction Company, Montgomery, Ala.—It is reported that this company will construct a line from Montgomery to Wetumpka if a bridge is built across the Tallapoosa River near Hughes' Ferry and a trolley line is permitted to be run across it. The line would connect with the Pickett Springs line and extend ten miles from Pickett Springs. The proposed line would cost about \$100,000.

Municipal Railway of San Francisco, San Francisco, Cal.—Plans are being considered by the Board of Supervisors for the construction of an extension along Army Street from Church to Third Street, thence over a street yet to be laid to Hunter's Point.

Vincennes (Ind.) Traction Company.—The Indiana Public Service Commission has entered an order dismissing the petition of the Vincennes Traction Company in which the company asked for permission to change its track on Seventh Street, Vincennes, from double track to single track. Charles A. Edwards, a member of the commission, stated that the situation is one for the courts to decide, as it hinges on the interpretation of the contract between the city and the company.

Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan.—Surveys are being made by the engineers of the Kansas City, Kaw Valley & Western Railway for its proposed extension to Topeka.

Bay State Street Railway, Boston, Mass.—An order has been issued by the Public Service Commission of Massachusetts directing the Bay State Street Railway to extend its line along Varnum Avenue as far as Totman Street. The company will reconstruct its tracks on Prospect Street, Methuen, and heavy 8-in. rails will replace those now being used.

Kansas City (Mo.) Railways.—An ordinance requiring the Kansas City Railways to build and operate a single-track line on East Twenty-fifth Street from Grand Avenue to Troost Avenue has been signed by Mayor Edwards. The construction of this line is a franchise obligation and it is expected that it will be built immediately.

Omaha & Council Bluffs Street Railway, Omaha, Neb.—Work will be begun this fall by the Omaha & Council Bluffs Street Railway on the construction of a line from Twenty-fourth and O Streets to Nineteenth and W Streets. The line will probably be extended to Mandan Park later.

New York Municipal Railway, Brooklyn, N. Y.—Bids were opened on Sept. 18 by the Public Service Commission for the First District of New York for the installation of tracks for the new Culver line in Brooklyn. Kaufman & Gorcey, New York, were the lowest bidders at \$103,680.

Interborough Rapid Transit Company, New York, N. Y.—The Interborough Rapid Transit Company on Sept. 11, placed in service the new connection between the Grand Central subway station, the Grand Central Railroad station and the Queensboro subway. This connection makes it possible for passengers to transfer between the two lines without going into the street. The new connection has been made possible by the extension of the platform of the Queensboro station some 500 ft. to the west to a point underneath the junction of Park Avenue and Forty-second Street. The Public Service Commission for the First District of New York has approved the award of the contract for the installation of the third-rail on the Queens rapid transit lines by the Interborough Rapid Transit Company to the Thomas Crimmins Contracting Company, New York. The cost of the work will be about \$22,300. The commission has also approved the award of the contract for the installation of the tracks on the Seventh Avenue branch of the Lexington Avenue line to Engel & Hevenor, New York, at \$229,440.

New York (N. Y.) Connecting Railroad.—Plans are being prepared by the engineering department of the Pennsylvania Railroad for the installation of an electric switch and signal system for the New York Connecting Railroad. The signal work, it is understood, will be installed by the Pennsylvania Railroad and the New York, New Haven & Hartford Railroad jointly.

***Goldsboro, N. C.**—It is reported that plans are being considered for the construction of a line from Goldsboro to Seven Springs, about 14 miles. George Norwood, Goldsboro, is interested.

Ohio Electric Railway, Springfield, Ohio.—Under a decision issued by Judge Evans of the Franklin County Common Pleas Court on Sept. 15, the Ohio Electric Railway must cease the use of the wooden trestle over the Norfolk & Western Railroad at Mound Street and use the subway at Main Street. This will necessitate track changes and other construction to cost about \$82,000. The court ruled that the Norfolk & Western Railroad should pay \$53,439 of this amount and the Ohio Electric Railway, \$28,561.

Youngstown & Southern Railway, Youngstown, Ohio.—It is reported that a number of improvements will be made by the new owners of the Youngstown & Southern Railway, which was recently sold at public auction to W. J. Blackburn, Youngstown, representing the bondholders.

Dunville, Ont.—Announcement has been made that plans for the proposed hydro-radial line from Dunville to Fort Erie are now ready. This proposed line will extend along the lake shore from Danville to Port Colborne, thence to Bridgeburg, via Fort Erie. The municipalities touched by this line will be asked to send each a representative to Toronto shortly when the plans and surveys will be presented, and arrangements made for a series of public meetings, after which the by-laws will be submitted in the various municipalities, probably on the same date as the usual January elections.

Sudbury, Copper Cliff & Suburban Electric Railway, Sudbury, Ont.—A report from the Sudbury, Copper Cliff & Suburban Electric Railway states that, owing to war conditions, the extensions contemplated will be postponed.

Portland & Oregon City Railway, Portland, Ore.—According to recent reports, work on the Portland end of the Portland & Oregon City Railway, known as the Carver Line, between East Twenty-second and Powell Streets and East Third and Clay Streets, in Portland, is progressing rapidly. The track has been laid from the latter intersection to East Ninth Street and is moving south on East Ninth to Division Street. It is expected that the track will be completed to East Third and Clay Streets by the end of September. This will be the temporary end of the line. At present cars are operated to East Twenty-second and Powell Streets, where connection with the west side is made by auto bus. Condemnation proceedings have been started in the Circuit

Court by the company to secure possession of a lot located at the southwest corner of East Twenty-second and Division Streets, Portland, belonging to E. M. Lueders and Alfred Lueders. The city of Portland, which is represented to have certain liens on the property as a result of sidewalks, street and sewer assessments, is also made a party to the suit. The company wishes to lay its tracks from the city of Portland southeast into the county of Clackamas, north on East Twenty-second Street, and thence west on Division Street. The lot in question is necessary for tracks.

Portland Railway, Light & Power Company, Portland, Ore.—The Interstate Bridge Commission and the Portland Railway, Light & Power Company have reached an agreement whereby the company will be permitted to install a connection with the interstate bridge across the Columbia River, between Vancouver, Wash., and Portland, Ore., from the end of its present Vancouver line, utilizing its old right-of-way and trestle up to the bridge, which is nearing completion. The proposed franchise submitted provides for the construction of new double tracks down the embankment approach to the bridge, a distance of approximately 2 miles. Under the law the franchise must contain a common user clause.

Coatesville, Pa.—Rights-of-way are now being secured for the proposed railway to connect Modena and Coatesville. H. G. Rambo, Coatesville, is interested. [July 29, '16.]

Schuylkill Railway, Girardville, Pa.—Plans are being made by this company for the reconstruction of its line in Girardville.

York (Pa.) Railways.—Application has been made to the Public Service Commission of Pennsylvania for the approval of the construction, alteration, or re-location of the crossing at the grade of tracks on the Pennsylvania Railroad at West York Avenue. The commission referred the application to the engineering committee of the State. Although West York Avenue, from Philadelphia Street to Linden Avenue, has been double-tracked for several years, there is but one crossing over the railroad tracks. This has often resulted in a tie-up of traffic. The improvements will cost approximately \$7,000.

Houston, Richmond & Western Traction Company, Houston, Tex.—It is reported that this company has been reorganized under the name of the San Antonio, Gonzales & Houston Interurban Company. Plans are being made to survey a new route for the proposed line to be built between San Antonio and Houston, about 225 miles. Steeve Holmes, Leesville, Tex., has been elected president to succeed C. C. Godman, Kansas City, Mo. [July 1, '16.]

San Antonio (Tex.) Traction Company.—Plans are being made by this company to double-track its line on South Flores Street and to construct 800 ft. of additional spur tracks.

Virginia Railway & Power Company, Richmond, Va.—Work will soon be begun by this company on the reconstruction of its track on First Street, from Broad Street to the Northside bridge, and on Floyd Avenue west from the Boulevard.

***Portage, Wis.**—Citizens of Portage and Baraboo are interested in the proposed construction of an electric railway to connect Portage and Baraboo. S. H. Peck, Portage, may give further information.

SHOPS AND BUILDINGS

Detroit (Mich.) United Railway.—Plans are under way by the Detroit United Railway for the construction of a freight terminal to occupy three city blocks between Dequinder and Chene Streets and Monroe Avenue and Macomb Street to take the place of the terminal at Congress and Fifth Streets. The estimated cost of the station, including the site, is \$1,000,000.

New York Municipal Railway, Brooklyn, N. Y.—The Public Service Commission for the First District of New York has set Oct. 6 as the date for the receipt of bids for the construction of station finish for six stations on the rapid transit railroads now being constructed under the dual contracts. One of the stations is the new diagonal station

on the Lexington Avenue line underneath Forty-second Street beneath Park and Lexington Avenues and which must be completed or substantially completed before the Lexington Avenue line is placed in operation. The other five stations are located on the upper portion of the Seventh Avenue line, as follows: Forty-second Street and Times Square, Pennsylvania Station (Thirty-third Street), Twenty-eighth Street, Twenty-third Street and Eighteenth Street.

Buffalo & Lake Erie Traction Company, Buffalo, N. Y.—Plans and specifications have been drawn by the Buffalo & Lake Erie Traction Company for the construction of a brick carhouse in Lackawanna. The proposed structure will replace the one now used at East Eagle and Jefferson Streets, Buffalo. The Buffalo carhouse was abandoned by the International Railway Company after the completion of its new Broadway carhouses near the east city line. By using the Buffalo carhouse the Buffalo & Lake Erie Traction Company is forced to operate over International Railway tracks causing considerable delay because of the circuitous route to its Buffalo terminal at Ellicott and Clinton Streets.

International Railway, Buffalo, N. Y.—Bids have been asked by the International Railway for the construction of a new concrete and steel passenger terminal in Lockport, to cost approximately \$30,000. The new structure will replace the frame building and will be used by the Buffalo & Lockport, Lockport & Olcott and Buffalo, Lockport & Rochester lines.

Philadelphia (Pa.) Rapid Transit Company.—Part of this company's carhouse at Fifty-ninth Street, near Vine Street, was destroyed by fire on Sept. 18. Ten pay-as-you-enter cars were destroyed. The loss is estimated at about \$30,000.

POWER HOUSES AND SUBSTATIONS

Pacific Electric Company, Los Angeles, Cal.—The power house of the Pacific Electric Company at Upland, which was recently destroyed by fire, is being reconstructed. The new plant will be modern in every particular.

Madison Light & Railway Company, Madison, Ind.—This company has entered into a contract with J. C. Reed, representing the Kent Light & Power Company, to supply energy for lamps and motors for the village of Kent and to farmers along the Kent Road. The Madison Light & Railway Company will erect the transmission line.

Manchester Traction, Light & Power Company, Manchester, N. H.—Plans are being prepared by this company for the construction of a power plant. French & Hubbard, 88 Pearl Street, Boston, are the engineers.

Cleveland (Ohio) Railway.—Fielder Sanders, municipal traction commissioner, has recommended to the City Council that the Cleveland Railway be permitted to contract with the Cleveland Electric Illuminating Company for power. This will result in the abandonment of the Cedar Avenue powerhouse and the construction of a substation, costing \$250,000.

Mahoning & Shenango Railway & Light Company, Youngstown, Ohio.—A contract has been awarded by the Mahoning & Shenango Railway & Light Company to Stone & Webster Engineering Corporation, Boston, for the erection of a high-tension transmission line from the generating station at Lowellville to Sharon, a distance of 14 miles. The wires will be carried on steel towers.

San Antonio, Gonzales & Houston Interurban Company, Houston, Tex.—This company, which proposes to construct an electric railway between San Antonio and Houston, will construct an electric power plant. Steeve Holmes, Leesville, president.

Roanoke Railway & Electric Company, Roanoke, Va.—This company is preparing to double the output of its plant. The plans provide for the installation of 500-kw. generating units, four new boilers, coal-conveying and handling system, condensers, pumps, etc., the construction of a substation and erection of two 11,000-volt transmission lines to the Viscose Company's plant; also another line when the Viscose Company's plant is completed. The principal contracts have been awarded. The cost of the work is estimated at \$250,000.

Manufactures and Supplies

CONDITIONS IN ELECTRICAL MANUFACTURING

Messrs. Rice and Tripp Outline Situation at Edison Illuminating Companies' Convention

At the recent convention of the Edison Illuminating Companies at Hot Springs, Va., E. W. Rice, Jr., president of the General Electric Company, and Guy E. Tripp, chairman of the board of the Westinghouse Electric & Manufacturing Company, made addresses describing in an interesting way the situation of those two companies as regards their manufacturing.

According to Mr. Rice, while the volume of business during recent months done by the General Electric Company has shown some recession, orders are still being placed at a rate in excess of anything in the company's previous experience. Promises made by producers of raw material and machinery and tools of every description have been found to be extremely unreliable, and this naturally interferes with the company's schedules of manufacture of finished goods. In Mr. Rice's opinion, there is little if any evidence of any change in the situation in the immediate future, and the company anticipates continued difficulties in obtaining raw materials.

After quoting some of the advances in prices since August, 1914, which the company has had to pay for copper, steel and other materials used in the manufacture of its products, he said that the fundamental difficulty has been the inability to get the materials either on time or in sufficient quantities. Referring to the machine tool market Mr. Rice said prices were constantly raised and deliveries lengthened until some six months ago the most reputable manufacturers began to quote merely nominal current prices subject to an advance not to exceed 20 per cent at the time of shipment. They also informed us that these prices, named for prompt acceptance only, were subject to change without notice.

The increase in prices has not been permitted to directly affect production unfavorably, as these prices have been met. The fundamental difficulty has been the inability to get machinery and materials either on time or in sufficient quantities. In some instances materials and machinery employed heretofore have been unobtainable. New materials, machinery and methods have been substituted, involving delay in production. Even after the company had succeeded in purchasing raw materials, and shipments had actually taken place, Mr. Rice said, there was no assurance that the materials would arrive on time.

The labor situation has also been very unsatisfactory, especially with regard to high-grade skilled employees and low-grade common laborers. There does not seem to be a sufficiency of either class to meet demands. The scale of wages for such employees is abnormally high, and this condition has been intensified by competition for labor among manufacturers. Coincidentally, there is every evidence that efficiency has, temporarily at least, declined, and the output of a man is lower than heretofore.

To a relatively limited extent only have contracts taken for munitions interfered with the company's regular business. If it had anticipated the prompt revival of business it would never have undertaken the manufacture of any munitions. None of the space normally devoted by the company to the manufacture of turbines, induction motors or similar apparatus has been occupied at any time for munitions, and the total space occupied in munition work of all character to-day is but 3 per cent of the company's total manufacturing space, much less than the proportion in value of the munition orders to orders for regular products. The last important order for munitions was taken over a year ago and the company does not now expect to take any further orders of this nature.

In Mr. Rice's opinion, "It would almost seem that the high watermark with respect to prices of raw materials and labor has been reached, and, if so, continuance of such con-

ditions, future prices of raw materials would naturally remain substantially unchanged."

The conditions discussed by Mr. Rice in regard to the difficulties of getting raw materials have also been found by the Westinghouse Company, according to Mr. Tripp. Mr. Tripp said that on Aug. 1, 1914, when the war began, his company had unfilled orders on its books of about \$8,000,000, representing only about two months theoretical full output of its shops. Business continued to dwindle, and on Sept. 28, 1915, which was the lowest point reached, the company had on its books approximately \$5,600,000 of unfilled orders. The real upward movement did not begin until about Nov. 1, 1915, and at the present time, although the company has increased its forces to nearly 30,000, it has on hand to-day unfilled orders for electrical goods amounting to considerably in excess of \$30,000,000.

These figures take no account whatever of orders for war munitions. In June, 1915, the company entered into a contract with the English Government to make rifles for Russia but undertook that work in a plant at Springfield, Mass., and not at its electrical works at Pittsburgh. The company has also undertaken contracts for machining high explosive shells, but while most of this work has been done in the Pittsburgh district it was performed for the greater part in buildings which were not then in use and had not been in use for a long time for electrical manufacture. As other orders were received, the regular workmen of the company who had been engaged on this work were returned to their former employment, and in Mr. Tripp's opinion the labor conditions of the company would have been just as serious as if it had never taken a war order.

Summing up the present problems of the company, he said:

"Our greatest task is to find a sufficient supply of the two extremes, viz., highly-skilled and the common laborer. The first is practically unobtainable and the latter is becoming scarcer, more expensive and less efficient.

"The great source of delay and curtailment of output has for some time been raw material. In July, 1915, our promise of delivery on steel was thirty to sixty days after placing of orders. In September and October these dates were lengthened, and in November promises were three months minimum and four months maximum. At that time we placed orders based on business in hand or in prospect; on Jan. 26, 1916, we received notice that deliveries would be six months, and on Feb. 18, 1916, another notification was received extending delivery to ten months.

"It has only been by constant pressure that we have been able to get material ordered as long ago as October and November, 1915; some of it was received in July this year and some has not yet been shipped. It has been necessary for our purchasing department to put a force of men in the field who live at the mills and endeavor to have our material put through. We have also had a corps of men scouring the country picking up steel wherever they could find it.

"Rubber-covered wire and cable are among some of the other articles the procuring of which has taxed the ingenuity of everybody from the president down."

Mr. Tripp also presented a statement of some of the more important raw materials used by his company and the time required to get them:

Aluminum, sheet meter disks, and meter covers 6 mo.	Porcelain, on dry-process, high-tension pieces, 8 to 12 wk.
Asbestos cloth 16 to 20 wk.	Porcelain, some large and difficult pieces 8 to 12 wk.
Brass rods, tubing and sheets 5 to 6 mo.	Steel drop forgings. 120 dys.
Copper rods, sheet and tubing 5 to 6 mo.	Steel shafts, specification No. 1476. 4 to 16 wk.
Copper wire, bare. 5 to 6 mo.	Steel shafts, specification No. 1478 4 to 16 wk.
Cotton-covered magnet. 5 mo.	Steel, bare 120 mo.
Silk-covered magnet. 5 mo.	Steel plates 10 mo.
Rubber-covered wire and cords 5 mo.	Steel sheets, Bessemer and O. H. 120 dys.
Drills, high speed. 5 to 6 mo.	Steel, cold-rolled strip. 6 mo.
Drills, standard, carbon 4 to 5 mo.	Steel, tool 4 to 6 mo.
Drills, special. 4 to 6 mo.	Steel castings 8 wk.
Emery wheels. 5 to 7 mo.	Tapes, asbestos. 60 to 90 dys.
German silver, sheet, bare wire, and insulated wire 5 to 6 mo.	Tapes, bias friction 30 dys.
Lamp cord. 5 mo.	Tapes, grey webbing. 120 dys.
Linen, 0.012 in. 60 to 90 days	Tapes, linen, 0.007 in. 120 dys.
Porcelain, on wet process, high-tension pieces. 8 to 12 wk.	Tapes, surgical, 0.020. 120 dys.
	Tapes, taffeta 120 dys.
	Tools, small 12 to 20 wk.

Mr. Tripp said that his company spent more than \$1,000,000 in research and development work next year.

IMPROVED CAR LIGHTING

Mazda Lamps in Large Units Have Proved to Be Most Efficient

Most all of the cars, both street and interurban, ordered during the last two years, have been equipped with lighting fixtures arranged in accordance with the better standards for interior illumination. The National Lamp Works of the General Electric Company, Cleveland, have done a vast amount of experimenting and have made many engineering investigations tending toward improvements in lamps suitable for car lighting and toward establishing better standards for car illumination. Compared with the old style methods the greatest improvements are now evidenced by the quite general use of shades and larger wattage Mazda lamps. Practically every road now uses the tungsten lamp in wattages ranging somewhere from 25 to 100 per lamp. Engineers versed in the science of interior illumination point out that it is economy to use shades in car lighting, particularly with high efficiency lamps. By the use of shades a better distribution of the light from large lamps is obtained, and thus in turn power consumption requirements are decreased. Many of the later types of cars are wired for illumination by few large units rather than from a multiplicity of small outlets so commonly used in the older type of cars. The cost of rewiring old cars, however, has been found to be so great that it has prevented the use of large lamps on the old cars of many roads even though the illumination efficiency is higher. Engineers of the National Electric Lamp Works point out that the modern electric railway car has a better installed wiring system and thus with the heavy fittings and shade holders and fewer number of circuits the car lighting circuits give far less trouble and the illumination has a far better effect on the public than the old-style car wiring with its multiplicity of outlets and small carbon lamps.

PRODUCTION OF STEEL SKELP

As supplementary to the graph showing the increase in production of steel pipe during the last twenty-nine years, published on page 519 last week, the table given below will be of interest. It is from a statistical bulletin issued by the Iron & Steel Institute and shows that the production of wrought iron skelp in this country has decreased not only relatively but actually, while that of steel has increased. Skelp, it may be added, is plate from which pipe is made by bending and welding the edges together and drawing the thick tube thus formed.

PRODUCTION OF IRON AND STEEL SKELP IN THE UNITED STATES
FROM 1905-1915. GROSS TONS

Year				Per Cent	
	Iron	Steel	Total	Iron	Steel
1905	452,797	938,198	1,435,995	31.5	68.5
1906	391,517	1,137,068	1,528,585	25.7	74.3
1907	444,536	1,358,091	1,802,627	24.6	75.4
1908	297,049	853,534	1,150,583	25.8	74.2
1909	370,151	1,663,230	2,033,381	18.2	81.8
1910	350,578	1,477,616	1,828,194	19.2	80.8
1911	322,397	1,658,276	1,980,673	16.3	83.7
1912	327,012	2,119,804	2,446,816	13.3	86.7
1913	312,746	2,189,218	2,501,964	12.5	87.5
1914	264,340	1,718,091	1,982,431	13.3	86.7
1915	262,198	2,037,266	2,299,464	11.4	88.6

ROLLING STOCK

Mahoning & Shenango Railway & Light Company has ordered ten city cars from the St. Louis Car Company.

Lehigh Valley Transit Company, Allentown, Pa., is reported to be considering the purchase of fifteen cars.

Philadelphia Rapid Transit Company, Philadelphia, Pa., lost ten pay-as-you-enter trolley cars in a fire which damaged part of the Fifty-ninth Street carhouse.

London & Port Stanley Railway, London, Ontario, Can., is reported to be considering the purchase of two cars, which are to be 10 ft. longer than the present equipment.

Trenton & Mercer County Traction Corporation, Trenton, N. J., has ordered from the Russell Car & Snow Plow Company, through Wendell & MacDuffie, one combination ballast car and snow plow.

TRADE NOTES

National Tube Company, Pittsburgh, Pa., whose plans for a new plant at Gary, Ind., were mentioned in this column recently, reports that the plant will have a capacity of 500,000 tons per year.

The Wendell & MacDuffie Company, New York, which for the past five years has acted as Eastern agents for the St. Louis Car Company, severed its connection with that company on Sept. 15.

Bound Brook Oil-Less Bearing Company, Bound Brook, N. J., is erecting a reinforced-concrete building, 50 by 100, at their plant No. 2, to take care of the rapidly growing business in its Nigrum impregnated wood bearings.

B. J. Carney & Company, Grinnell, Iowa, reports that William Mueller & Company, 1729 McCormick Building, Chicago, have been appointed sales representatives for Western red cedar poles. Mr. Mueller for a number of years has been connected with the Western Electric Company as manager of the pole department.

McQuay-Norris Manufacturing Company, St. Louis, Mo., reports that Frank J. Stanley, who has been traveling on the Pacific Coast for the company, has been transferred to Cincinnati, Ohio, as manager of its branch there. The company has also added to its sales force by securing the services of John Frier and Max S. Jones, mechanical engineers. They will travel out of the home office.

Ohio Brass Company, Mansfield, Ohio, recently sold to the Boston Elevated Railway, 200 coupler equipments, which will be installed on 100 new center-entrance motor cars to be operated in the East Boston tunnel. These couplers are of the air-connected type and are furnished in addition with an electrical connecting feature, carrying fifteen points for the accommodation of the train line circuits, electro-pneumatic brakes and the train signal lines. With this coupler equipment it will be possible in one operation to couple the cars, connect the air, and all electrical circuits between cars. The operation is entirely automatic, all connections being made by impact, as with ordinary couplers.

ADVERTISING LITERATURE

Chicago Pneumatic Tool Company, Chicago, Ill., has issued bulletin E-43 describing and illustrating the Duntley universal electric hammer drill.

John F. Byers Machine Company, Ravenna, Ohio, has issued a circular describing, illustrating and giving the principal dimensions of its improved Model C auto-crane.

Carbic Manufacturing Company, Duluth, Minn., has issued a booklet on the Carbic light. The booklet illustrates the various types and describes the construction, operation and other points of excellence of this apparatus.

Jewett Car Company, Newark, Ohio, has issued a circular on its one-ton truck attachment for the Ford chassis. It describes and illustrates the method of substituting the attachment for the rear axle and drive, at the same time reinforcing the frame. Pictures of a number of bodies are given.

Esterline & Angus, Indianapolis, Ind., have prepared a booklet entitled "An Unique Service by an Unique Organization." This book sets forth the functions performed by this organization and illustrates its capacity and resourcefulness for the successful solution of difficult problems in engineering design. The organization confines itself strictly to that portion of the engineering work of its clients, which by reason of its nature does not come within the scope and experience of their regularly employed engineers. The efforts of this concern are devoted largely to the development of the electrical and mechanical ideas requiring detailed engineering study. Work done includes the design and construction of power-stations, development of a steam turbine rotating element, design of magnetic system for handling sheet metal plates and the development of a regulating device for correcting voltage condition and making possible the successful use of incandescent headlights on interurban cars. This organization serves a number of important manufacturers in the capacity of expert engineer, performing the duties of an engineering development department.