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Changes of advertising copy should reach this office by 10 a. m. Monday preceding the date of publication, except the first issue of the month, for which changes of copy should be received two weeks prior to publication date. New advertisements for any issue will be accepted up to noon of Tuesday for the paper dated the following Saturday.

Of this issue of the Street Railway Journal, 8000 copies are printed. Total circulation for 1906 to date, 229,100 copies, an average of 8182 copies per week.

The Last of the Cable Cars in Chicago

At last the cable cars of Chicago are to go. Both the Union Traction Company and the Chicago City Railway Company have agreed to the recently passed ordinances providing for the substitution of the trolley for the cables, and are now putting up the overhead system. It is safe to say that no one regrets their passing out of existence, and least of all the companies. The sooner they go, the better for all concerned. The people are tired of traveling at their slow, monotonous pace and of being subjected to the racking and jolting of the single-truck cars. The operating companies are as weary of the limited carrying capacity of the overloaded cable lines, of the expenses of maintenance of the worn-out equipments, and of the frequent breakdowns.

But the passing of the cable does not mean the settlement of the traction situation in Chicago. It is only a temporary expedient, and was brought about to a great extent by the necessity for lowering the tunnels under the Chicago River. A final settlement will carry with it some scheme for a complete overhauling of the different systems. Of the plans being considered, those which provide for the ultimate purchase of the lines by the city seem to be a happy solution to the long vexing problem. If for any reason the city can not purchase them, they may be bought by an outside company at a value a little above the worth of the actual properties. This plan will at least put the present companies in a position where they will feel warranted in making the investments necessary to modernize their systems. When this is done, no doubt the majority of the people will be satisfied, and then it is very probable that the municipal ownership idea will gradually weaken.

Terminal Stations

It is difficult to say which feature attracts the attention of the visitor most in the magnificent terminal station and office building in Milwaukee, which we describe in this week's issue—the convenience and the completeness with which every detail which would add to the convenience of the users of this building has been thought out and wrought out, or the care devoted to the decorative features and the success which has been achieved in their treatment. The Milwaukee company has always had the reputation of doing thoroughly whatever it undertook, and having decided upon a terminal and office building, no pains were spared to make it not only the best which could be had for the purposes for which it was designed, but also to make it an ornament to the city in both exterior and interior decoration. Opinions may differ as to the benefits to be derived by the erection of handsome buildings by a purely business corporation. Some undoubtedly would claim that a company organized exclusively for profit should keep its structures within plain lines and should design them for utilitarian purposes only. Fortunately, however, this idea is passing away. A walk through the downtown streets of any of our large cities which are lined with modern buildings will show the increasing tendency toward

the artistic, even in business structures. The most important corporations, whether they supply transportation or something else which the public needs, and those which are governed by the broadest principles, realize that there is not only a direct monetary advantage in the erection of handsome office buildings, stations, and so on, but that it is also a duty which they owe to the public. And the larger and more important the corporation the more it is called upon to erect its necessary structures in a form which will be a subject of pride to the community from which it derives its support. We do not mean that many railway companies are in a position to duplicate or approximate the work recently accomplished in Milwaukee, but we do believe that the example set in that city by the company in the construction of its public service building is the right one to follow; that more attention will be devoted to artistic effect in public buildings in the future than has been the case in the past, and as public service corporations increase in importance there should be and will be more of an effort to plan their work so that whatever they will do in the way of construction will be an ornament to the city in which they conduct their business.

Accidents in Getting On and Off Cars and Their Prevention

The report of the accidents on the Chicago street railway lines prepared for Mayor Dunne, to which we referred last week, shows that twenty-one accidents out of a total of fifty-two were caused by people stepping on or off moving cars. For accidents of this nature, it is true, the operating company is not to blame. But it is interesting to consider, when such accidents are frequent, whether they could be reduced either by educating the public to the danger of attempting to leave or to board a moving car, or the more strenuous method of providing gates which make it impossible for them to do so.

The report states that the accidents were usually caused by people getting off backwards. It is presumable that women were usually the victims. It is rather inexplicable why women instinctively choose the most dangerous way possible to get off a car. Some companies, including those in Chicago, have attempted to reduce this practice by placing notices about the car cautioning passengers against this method of dismounting.

But no matter how hard the companies may try to impress on the passengers the dangers of getting on and off cars when in motion, it does not seem that accidents from this cause can be completely eliminated. When a person has to run to catch a car he is likely to put everything else out of mind but the desire to get on board, and consequently forgets any previous cautions.

About the only way in which such accidents can be cut down effectively is to adopt some type of gate, like that used in Minneapolis, which can be kept closed except while the car is standing. A mirror is usually placed on the vestibule post at such an angle that the rear entrance controlled by the gate is visible to the motorman when standing before the controller. The motorman opens the gate only after the car has stopped and closes it just before he throws on the power.

We do not believe this precaution is always or even often necessary, and undoubtedly its introduction in any city would raise a storm of protest from patrons, certainly at first. But as a final resort it is worth considering. About the only argument against it is that time is lost in loading and unloading passengers. But this argument does not seem to hold in the light of the results obtained where the gate has been in use. Immediately after its adoption there will naturally be considerable confusion and inconvenience, due to the fact that both the trainmen and the public are not accustomed to it. But as soon as all get used to it no delays are caused by its presence, and its adoption makes accidents in getting on and off cars of rare occurrence.

Another argument in favor of such a gate is that it permits the conductor to forget completely the rear platform, and allows him to give more of his attention to the collection of fares.

Making History in the Central West

The past few weeks have been an epoch making period in the history of the great network of electric lines in the Central Western States of Ohio, Michigan and Indiana. The roads in that district have been undergoing changes similar to those which took place in the history of the steam roads several decades ago. Originally these larger transportation enterprises were built in short links between important centers. Then they were connected up into through lines operating separately. Many of the properties were over-capitalized or were incapable of supporting themselves as single units, so that the original promoters failed or were obliged to sell out at a loss. Gradually the lines were consolidated into long roads, and finally these roads were in turn brought together into great systems. The institution of economies in operating, the creation of new business by reason of long-distance connections, the squeezing out of watered stocks, the improvements in equipment and speed, all have combined to make the steam railroads of to-day the most substantial business institution in the country, where formerly they were weak members, each fighting the other and struggling for an existence.

This is exactly the transition which is rapidly coming to a focus among the electric interurban roads of the Central West, and as intimated, some very important incidents in this history have just taken place. On July 1 the Indiana, Columbus & Eastern Railway, a system which compares quite favorably with some of the big steam systems, commenced operation. This corporation embraces all the roads in Ohio recently acquired by the so-called Widener-Elkins syndicate, and includes fifteen scattered city and interurban properties with nearly 600 miles of track. Each road was formerly operated by its own petty staff of managers, engineers, superintendents, and numerous other officers, but all are now amalgamated into one large railway system with a central operating office, divided into sections under division superintendents but with one engineering force, one auditing force and one traffic department.

The Indiana lines of the Widener-Elkins syndicate, some ten in number, have up to this time been grouped together under three managements, but it is understood that these also are soon to be brought together under one head, forming a system somewhat larger than the Ohio system mentioned. It seems probable that as soon as these plans have been perfected the properties in the two States will be consolidated into one, forming a traction system of some 1500 miles, with a total capitalization of around sixty millions of dollars, a sys-

tem which will touch nearly every important city and village in the two States. Incidental to these merger plans is the interesting announcement that fine traction terminal stations similar to the one in Indianapolis are to be erected in Columbus, Dayton and Toledo. Adequate and convenient terminal facilities were never provided by the steam roads until they got together and joined interests, and here again history repeats itself.

From Cleveland comes the report that the Everett-Moore syndicate has fully recovered from its embarrassment, and with the aid of Eastern capital it has now not only regained nearly all the properties which it lost at the time of its failure four years ago, but it is acquiring additional links and is soon to announce a merger of traction properties into one big system which will equal if not surpass in importance that in Central Ohio and Indiana. Considerable progress has been made in this direction. The Detroit United System, including lines recently acquired, now embraces some 650 miles, while the roads in Northern Ohio, already grouped together under a community of interests, and others that will doubtless be picked up ere the consolidation goes into formal effect, will mean a system of nearly 2000 miles. It would mean the magnificent city systems of Cleveland, Toledo, Detroit and several smaller cities, and a chain of high-speed interurban roads that would reach from New York to St. Louis if stretched into a continuous line.

And as if to emphasize the weakness of the individual small road and the urgent need for combination of interests, there is the almost simultaneous announcement this week of the failure of two important independent lines, one in Ohio and the other in Indiana. Both of them were supposedly strong, promising propositions and capable of great development. They failed because of lack of capital to tide them over a short period of pressing need, and will undoubtedly pass into stronger hands and become amalgamated with other big systems.

The Three-Cent Fare Heresy Again

As we noted last week, Cleveland is having another session with the cheap-fare banshee that seems to have become a sort of municipal retainer, periodically howling about as a preliminary to the demise of its hopes. It has come to pass that a cheap-fare road may actually at last be built and operated in Cleveland on what one may call an idealistic basis for rapid transit. There has been so much fruitless talk pro and con that it is really a relief to feel that at last the theory may be tried and its merits once for all determined. Its promoters and the other fellows can hardly be expected to agree even upon statistics, so that it is in no wise surprising to find widely different views as to the probable result. The new company proposes to start with clean books, to build for cash obtained by the sale of cumulative 6 per cent stock, and to operate for profit if it can find any upon a 3-cent basis. If cheap fares cannot be made to pay under this method of financing, they cannot be made to pay at all. It is often claimed, sometimes with reason, that many roads are to-day successfully paying interest charges on the capitalized mistakes of a decade or more. If this be so, then a road starting without any mistake save too low fare may have a fighting chance for profit. On the other hand, a three-cent fare means reducing the gross receipts per passenger by one-third, which is an enormous decrease of price for any business.

Most electric roads to-day operate on 60 to 70 per cent of their gross receipts based on about 4½ cents net per passenger. If these receipts are cut down by one-third the chances of paying operating expenses and leaving anything to the good are certainly precious slim. The best that can be said for the three-cent fare proposition on the basis of the general data is that it lies in the debatable ground between success and failure, with its only hope resting on a short road, no transfers, and an altogether abnormal density of traffic, not reasonably to be expected under our usual American conditions. On the basis of the published statements of the promoters of the new company, it can secure estimated gross receipts of $288,000, but this is possible only by carrying more than 9,000,000 passengers annually upon 10 miles of track worked on ten-minute headway. This is a stiff proposition even for a promoter to justify, being something like 115 passengers per trip steadily during eighteen hours of daily service. In view of this we would meekly suggest that the case of the new company is a good one for trying the no-seat-no-fare theory in a practical way. Looking at the case from the viewpoint of the opposition, an engineer quoted in our article last week estimated the cost of operation on the basis of five-minute headway, which would seem to be necessary to decent earnings, at a little over $100,000 per year, which calls for 3,333,333 passengers per year merely for operating expense, and this is probably conservative. This load there is certainly reasonable expectation of getting, but where do the profits come in? And how about depreciation? On the estimated cost of the first ten miles of road another million passengers must be added to pay the expected 6 per cent, and if anything suitable is charged off for depreciation, still another million

To be perfectly fair, we admit that there are few electric roads which set aside 6 per cent for depreciation. Too many of them trust in Providence and keep depreciation executing a double shuffle in the bookkeeping department until it is time for another bond issue. But in starting in to demonstrate the sufficiency of a three-cent fare one may well face the depreciation question, for it will certainly come in the form of wholesale replacements long before the expiration of the twenty-year franchise. The fact is that the semi-socialistic element seldom realizes the financial straits in which many street railway properties have been—it sees only the prosperous roads, some of them undeniably over-capitalized but flourishing because the community flourishes; or the partially successful roads keeping up a brave front and trusting to the growth of the country to pull them through the slough of depreciation, while putting all the available surplus into extensions. If one looks back and pictures to himself the dreary wastes of outlying dust and mud now converted into prosperous suburbs by the street railways that took long chances and pulled through, he will realize what the uniform five-cent fare has done for the country. Many a line has kept its nose above water on the difference between five cents straight and six tickets for a quarter, which is, if one stops to think of it, a considerable margin in reckoning a few million fares a year. We shall watch the next stages of the proposed Cleveland experiment with keen interest.

THE NEW PUBLIC SERVICE BUILDING OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY

The policy of establishing terminal stations for interurban electric railways is becoming more popular, but the Milwaukee Electric Railway & Light Company is certainly the first to combine, in a large city, the two features of a commodious terminal station for its interurban service and an office building devoted exclusively to the needs of the company. But the structure erected by the company is interesting and unique in other ways than its size and uses. It is noteworthy even in this age of magnificent buildings for the attractiveness and taste of its architecture, the beauty of its interior decoration, and the thoroughness of all of its appointments. Some idea of its character will be had from the fact that, besides comprising an office building for all of the offices of the company and a terminal station with all the requirements for passengers, it also contains dining rooms, machine shops, physical and chemical laboratories, a convention hall, and when fully completed a 4500-kw generating plant will be installed in the basement.

THE RECENTLY COMPLETED PUBLIC SERVICE BUILDING OF THE MILWAUKEE ELECTRIC RAILWAY & LIGHT COMPANY, AT MILWAUKEE

The care with which each detail has been arranged will be appreciated from the statement that throughout it has been constructed under the personal direction of John I. Beggs, president and general manager of the Milwaukee Electric Railway & Light Company. It has been fitly named the Public Service Building, as it is the headquarters in Milwaukee for the electric lighting, public heating and transportation services upon which the welfare of the community depends in such large measure.

It occupies the entire block bounded by Sycamore, Second and Third Streets and Everett Street, and measures 200 ft. x 300 ft. It is of steel framework construction. The columns are encased in concrete and rest on concrete footings which are carried by piles. While the building is at present four stories high, provision has been made in the strength of the columns and the manner in which they are carried through the roof, for an additional height of eight stories whenever the growth of the company's business demands. The basement and the first floor of the building cover the entire block, but the three upper stories are broken by three light courts 20 ft. wide which extend from the rear and are carried about three-fourths the depth of the building dividing the rear of the building into four wings.

The exterior of the building is shown in one of the accompanying engravings, and presents a very pleasing appearance. For the first story, the trimmings and cornice are of Bedford stone, while the main body is faced with warm gray Norman brick. The appearance of the structure as a whole is heightened greatly by the hammered copper cresting which surmounts the cornice. The main facade on Sycamore Street is flanked by two pavilions carrying ornamental balustrades and canopies. This facade is further ornamented by the carved stone work carried up to the third story about the main entrance, midway between the two pavilions.

The rotunda just inside the main entrance, which is carried up two stories and finished entirely in marble, is one of the most ornate portions of the building. The walls, which are of the lighter shades of Sienna marble, obtained from an old convent quarry in Italy, are enriched by a frieze of panels of Swiss Cipilino. The main entablature and balustrade surrounding the rotunda at the second floor level are carried by a series of Doric columns of white Italian marble. In the second story, immediately above, are an equal number of Ionic columns of similar marble. The ceiling of the rotunda is highly ornamented with stucco, and from its center will be suspended a large electric chandelier of attractive design. In the main entrance to the left of the entering doors are the two elevator shafts, which are provided with grills of Tiffany bronze.

Directly opposite the entrance doors is the main stairway, which, branching in opposite directions at an intermediate landing, reaches the second floor near the entrance of the theater on one side and at the entrance to the auditing department and the club quarters of the men on the other. This stairway and that reaching the third floor are provided with a balustrade of white Italian marble, while the treads and risers are of Joliet limestone. A narrower stairway, reaching the fourth or top floor, is provided with a balustrade of Tiffany bronze of a very ornamental design.

The floors of all the corridors above the first story consist of slabs of Joliet and godfrey gray limestone with borders of rouge royal and dark Tennessee marbles. The walls of the corridors on the second and third floors are finished with a wainscoting of white Italian marble, while the finish of the fourth-floor corridors is in light gray Tennessee marble.

The interior woodwork of practically the entire building is of birch. In fact, the only exceptions are the suite of the president and general manager, which is paneled of fumed oak, and the directors' room finished in solid mahogany. The desks, tables, and practically all the furniture in the building were built on special order and are of the same material as the interior finish.

While the architectural and general structural details of the building have been given very close attention, the engineering features probably received even more consideration. This would naturally be expected, since the construction of the building as a whole was under the supervision of an engineer having at hand a corps of engineers who were to be the future occupants of the building.

A great deal of attention was given to the question of lighting, both natural and artificial, and the building is a good example of the most approved ideas in what is now known as illuminating engineering. The light courts already referred to and the general arrangement of the rooms obviate the use of artificial light during the day in all parts of the building with the exception of the basement and a few closets. Artificial lighting is by electricity alone, and quite a series of

MAIN ENTRANCE TO THE BUILDING

tests were conducted by O. M. Rau, superintendent of the electric lighting department, and his assistant, F. A. Vaughn, electrical engineer of this department, in order to arrive at the best method to be followed. The method finally decided upon is in line with the best knowledge on the subject, that of providing an even distribution of light rather than concentrating lights in central chandeliers and giving a surplus of light in some places and dark corners in others. With very few exceptions all portions of the building are lighted by individual incandescent lamps suspended about 3 ft from the ceiling by brass electroliers. These electroliers are fitted with the new General Electric metallized filament lamps of 50, 75 and 100 cp, the intense glare of the filament being destroyed by frosting the lower portion of the bulb. Each of the electroliers is fitted with either a class C or a class D Holo-

INTERIOR OF MAIN ENTRANCE TO THE BUILDING

phane reflector, the former over desks where a concentration of light is desired, and the latter where general diffusion is wanted. The lighting of all the offices was figured out on a basis of 2 candle feet at the desks, and practically the same basis was used in the lighting of the corridors, toilet rooms and other portions of the building. In several portions, for example, the theater and the directors' room, an ornamental effect rather than equal distribution was desired, and here some pleasing modifications in the method of lighting were followed.

FIRE PROTECTION

Although the building is of fireproof construction, careful attention has been given to protection against local fires in any portion of it. Hose racks with standpipe connection are located at convenient points in the corridors and other places, and the car sheds, freight elevator shafts, and basement door openings are provided with automatic fire doors. The car sheds store rooms and the stage of the theater are fitted with automatic sprinklers, a total of 2000 Grinnell sprinkler heads being installed in the building. These heads are all connected to tanks each having 10,000 gallons capacity, in the basement, in which the pressure of the city mains is maintained by a 6-in. electrically driven two-stage centrifugal pump. A check valve keeps up the pressure in the storage tank in case the pressure in the city mains falls. In event of an emergency the storage tank just referred to may be connected to the two 10,000-gallon tanks used for the

storage of spring water, and the contents of these may be discharged through the sprinkler system. The stand pipes are connected to the city system by two 6-in. mains which enter the building one at the east and one at the west end.

DRINKING WATER SUPPLY

Throughout the building are drinking fountains supplied with water from the Waukesha springs. The piping system connected with the fountains centers in two concrete tanks in the basement, each of 10,000 gallons capacity. Water from the springs is hauled to the building in tank cars and is discharged from these into the tanks, and pumped through the building by two motor-driven centrifugal pumps. The water in the system is kept at a temperature of about 40 degrees by coils from an ice machine in the basement.

TOILET ROOMS

The building is well supplied with toilet rooms, and there is a total of about 100 wash basins. All these rooms are finished in Tennessee marble. The wash basins are of special design to prevent water splashing out over the sides; this design was one of the many details of the building to which Mr. Beggs gave his personal attention. The plumbing and piping in all of the toilet rooms has been so arranged that any part of it may be gotten at for repairs without removing or disturbing any of the permanently installed fixtures.

VAULTS

The arrangement of the fireproof vaults with which each office is supplied is somewhat out of the ordinary. They occupy eight separate shafts which extend from the footings of the building to the roof. The shafts are provided with floors of concrete slabs and doors built by the Cary Safe Company. All of the book shelves and filing cases in the vaults are of metal.

ELECTRIC CLOCKS

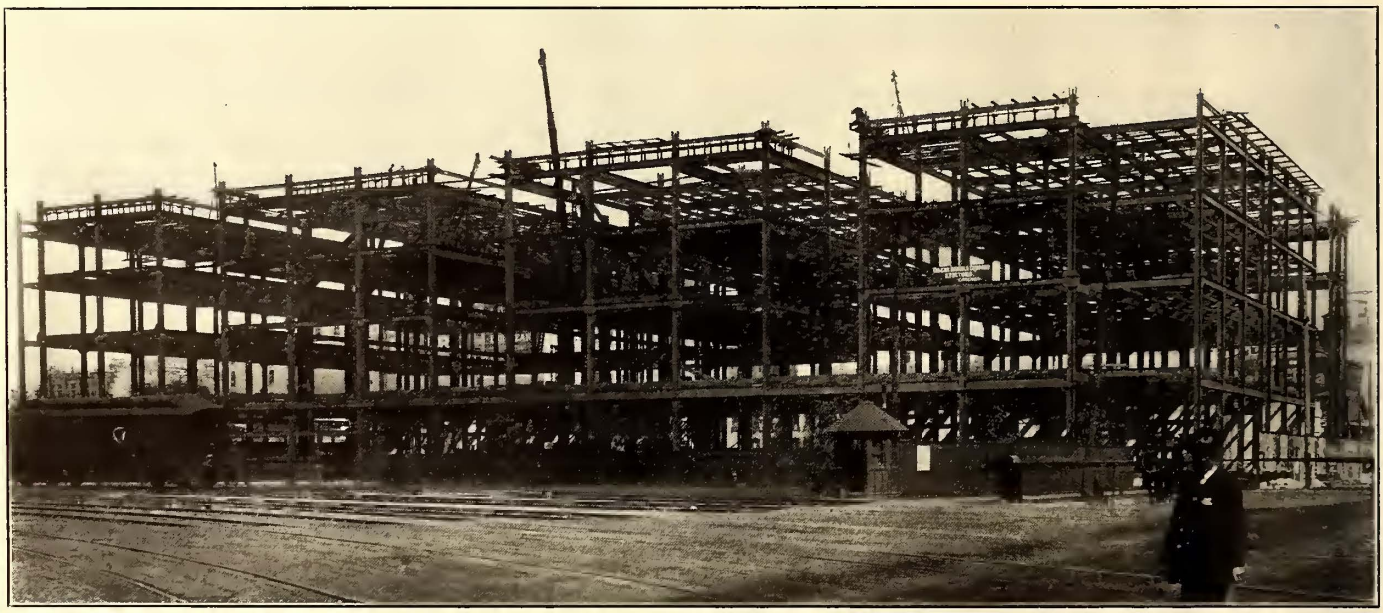
In the several offices and corridors of the building there are placed about forty electric clocks, which are operated in synchronism with a master clock located in the telephone exchange room. One of the clocks is placed over the main entrance to the building, another is mounted over the main stairway from the first floor, while a third, which is of unique design, is located in the room of the private secretary to the president and general manager. This latter clock is placed in a panel with carved figures representing industry and time on either side.

PNEUMATIC TUBE SYSTEM

The transmission of reports, specifications, and documents of various kinds between the different departments is greatly facilitated by a Lamson pneumatic tube system which centers in a room on the second floor of the building and connects with twenty-one terminal heads in the various offices. The system is operated with compressed air from tanks in the basement, and the electrically controlled valves are supplied with current from storage batteries in the telephone exchange room. Each of the cartridges in which the papers are carried has printed upon it a directory of the offices in the building. When a person wishes to transmit a document to a distant department he turns an indicator on the cartridge to the number of that department as shown by the directory, and slips the cartridge into the tube. It is received in the central tube room by an operator who sends it on to the department indicated. By means of this system a document can be sent to the most distant part of the building and can be signed and returned in about one minute.

TELEPHONE SERVICE

The provisions for telephone service in the building also received the attention of the electric lighting department which has charge of the telephones of the dispatching system. The Strowger automatic system is combined with the Bell system. A telephone room on the second floor contains an automatic exchange as well as a manual switchboard for the building and a despatcher's board. In an adjacent room is installed a storage battery with a motor generator which is used in connection with the telephone system, while quite an elaborate marble switchboard for all the low-voltage electrical apparatus in the building is installed in the partition between the rooms. There are at present about 100 telephones installed throughout the building. The wires are carried in conduits to distributing points on each floor, thence they extend under the floor and are brought up at points where desks are at present located or where they may possibly be located in the future. In some of the rooms these outlets are placed at intervals of about ten or twelve feet, so that no matter where a desk may be placed telephone connections can be obtained without difficulty. Desk telephones of the Strowger automatic system are employed, but are fitted with Bell transmitters. Each telephone is provided with a key which permits the use of the manual or of the automatic



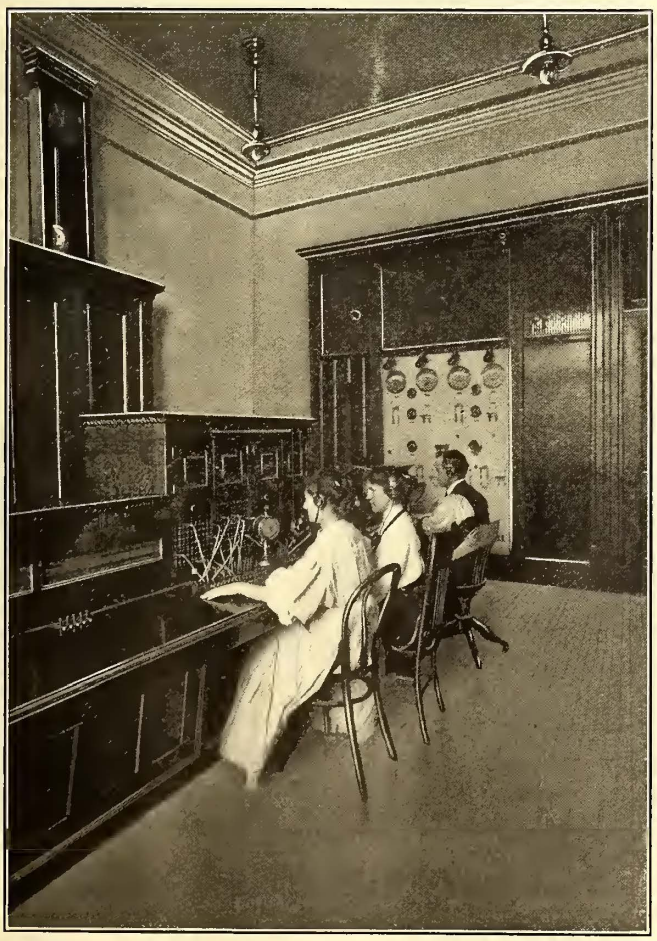
A VIEW TAKEN OF THE STEEL FRAME WORK OF THE BUILDING FROM THE REAR

exchange at will. The manual board is interconnected with the despatcher's board, so that any of the offices may be given connection with the booths of the despatcher's system out on the interurban lines. Connections are also made with the city telephone system and with long-distance telephones.

In some of the departments a rather unusual arrangement is carried out by having what might be termed branch exchanges. While calls may be sent out from any telephone in the department, all calls are received at a central desk where the nature of the business is determined and connection then given to the proper party.

WIRING

All the wiring for the lights, power, telephones, clocks, and pneumatic tube system is inclosed in iron conduits embedded in the concrete floors and carried between the separate floors in shafts. The wires to each floor are run to central switchboard cabinets containing the switches for the lights and motors and the terminals for the low-voltage wires. The switchboards, which were built by the electric lighting department, are equipped with a combination fuse and switch designed by Mr. Rau, which is so built that the enclosed fuses form the switch blades and thereby save the space usually taken up by the fuse bases. The switchboard in the basement contains a separate lighting panel for each floor of the building, and in addition one panel of all the power circuits. The lighting panels are provided with both a. c. and

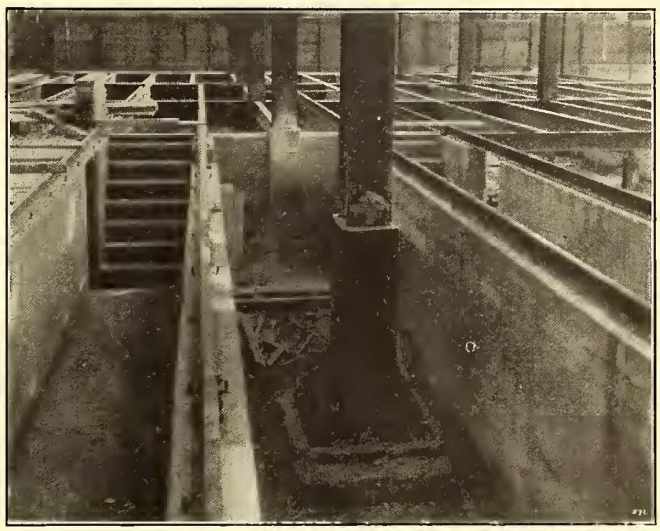


TELEPHONE ROOM, SHOWING DESPATCHERS' BOARD AND CENTRAL EXCHANGE FOR BUILDING

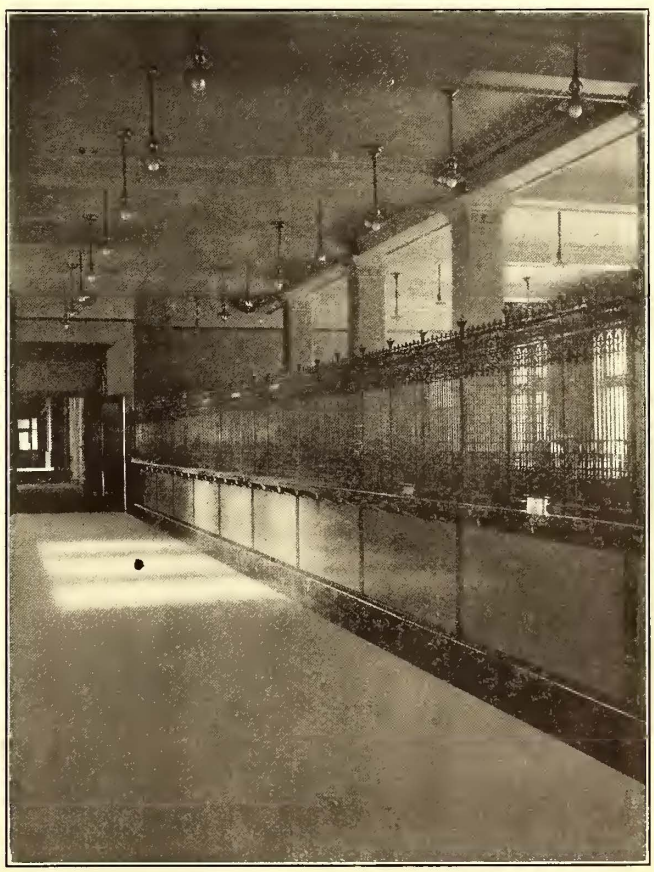
d. c. buses. Two feeders to each floor leave the separate lighting panels, one feeder going direct to a cabinet in the east end of the building, while the other reaches a cabinet in the opposite end. Other feeders connect the two cabinets with a third, forming a loop circuit, so that in the event of failure of one of the feeders the other can be used to light the whole floor. The wiring also permits current from either the d. c. or a. c. bus-bars to be supplied to each separate floor.

VACUUM CLEANING SYSTEM

A cleaning system consisting of a system of piping extending to all parts of the building, and two steam aspirators in the basement for producing a vacuum in the pipe system is



VIEW OF CAR SHEDS DURING CONSTRUCTION, SHOWING CONCRETE PITS

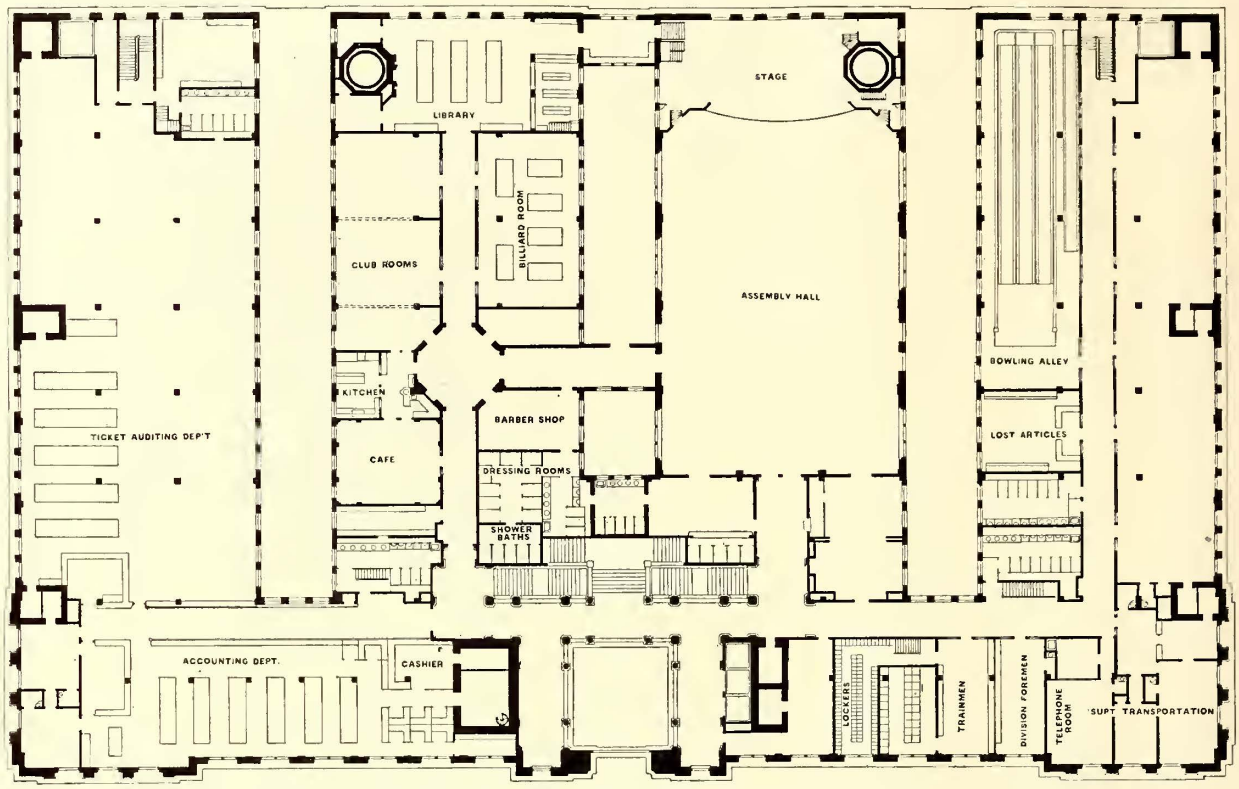


VIEW IN THE ACCOUNTING DEPARTMENT, SHOWING THE METHOD OF LIGHTING, AND MARBLE COUNTER SURMOUNTED BY GRILL

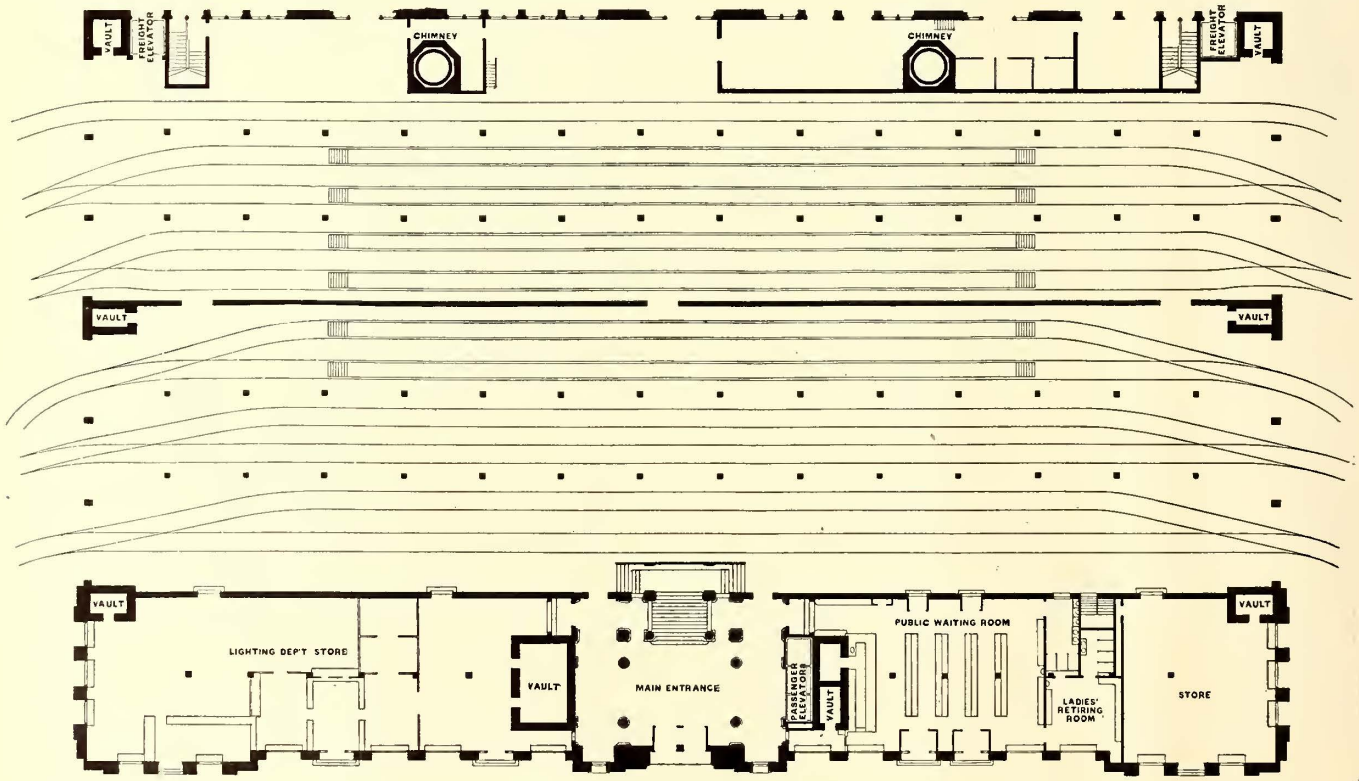
installed. The outlets are at such intervals that all portions of the building can be reached by hose of convenient length, and enough tools and apparatus is provided to keep twenty janitors at work. The system was installed by the American Air Cleaning Company, of Milwaukee.

PASSENGER WAITING ROOM

Practically all the ground floor of the building is devoted to a central car house and terminal station for the interurban and suburban lines. The front portion east of the entrance, however, is used by the electric lighting department as a salesroom and display room, is fitted with marble counters, and is provided with closed cabinets in which supplies are kept. The public waiting room just west of the main entrance, which is finished in Tennessee marble, has in connection with it a retiring room for ladies and proper toilet facilities. Along the east wall are a lunch counter and cigar stands. The counter is of Tennessee marble to match the general finish of the room, while the cigar cabinets are zinc lined. The waiting room opens directly out into the car sheds, which, containing six tracks, extend the full length of the building and connect with the car tracks on Second and Third Streets. The repair sheds, which are separated from the car sheds by a brick wall, contain five similar tracks.



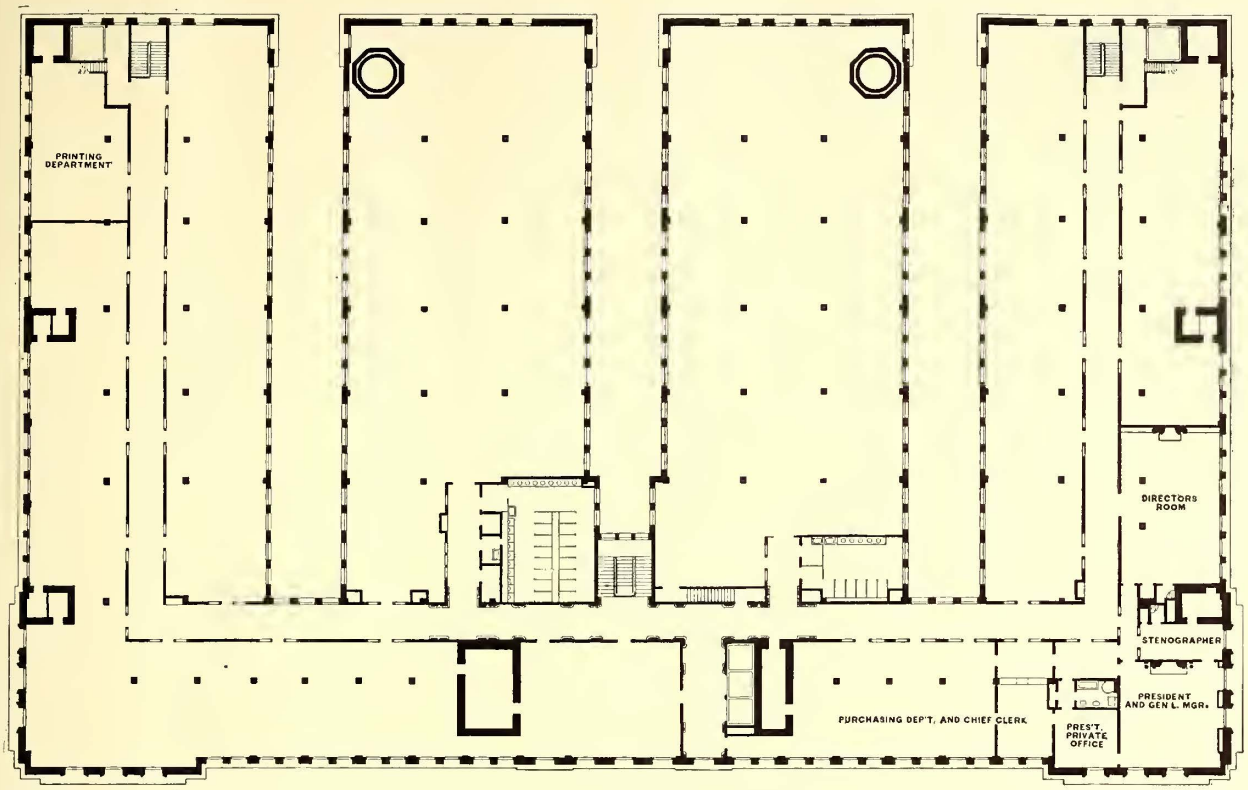
THE SECOND FLOOR OF THE MILWAUKEE PUBLIC SERVICE BUILDING, SHOWING LOCATION OF VARIOUS DEPARTMENTS AND RECREATION FACILITIES FOR THE EMPLOYEES



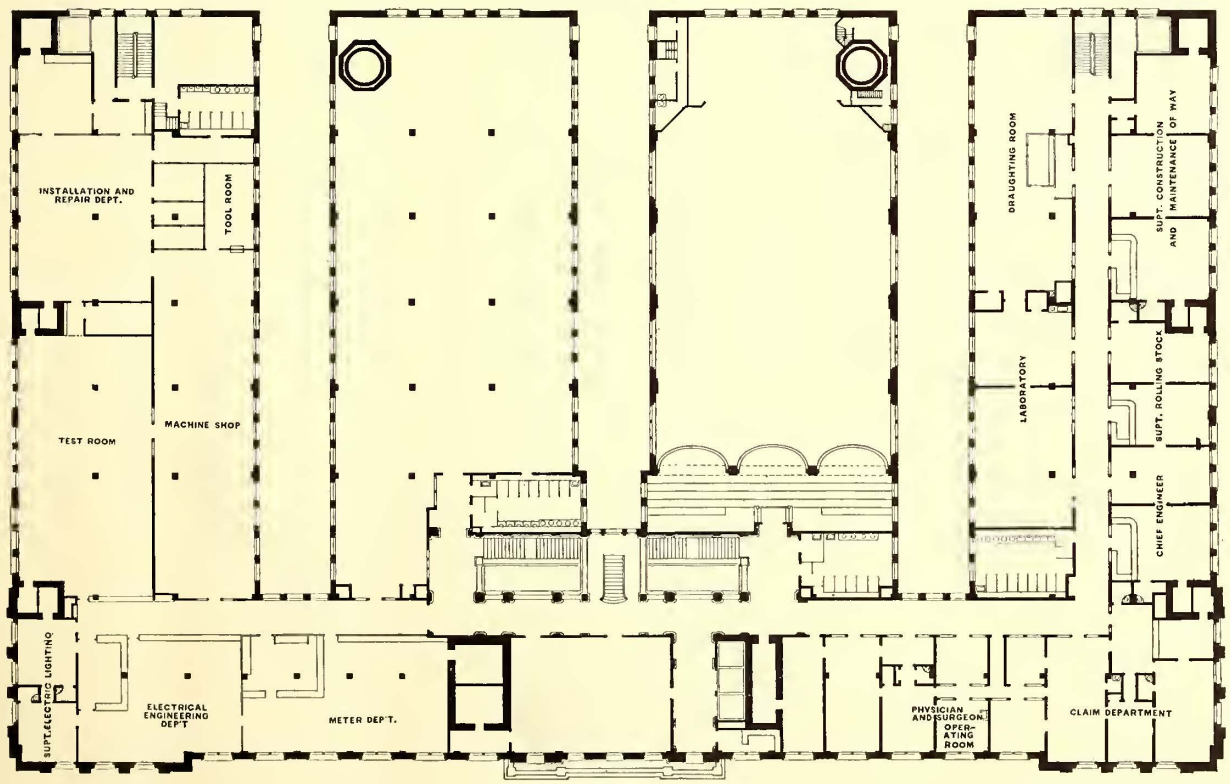
PLAN OF THE FIRST FLOOR OF THE MILWAUKEE PUBLIC SERVICE BUILDING, SHOWING ALSO THE TRACK LAYOUT

TRACKS AND PITS

The floors of both compartments are of reinforced concrete, while the pits under the two southernmost tracks in the car sheds and also under four of the tracks in the repair shop are of concrete construction, and slope to a drain at one end connected with the sewer. The pits, moreover, are heated by coils of pipe along one side and are lighted by incandescent lights wired in iron conduit. The lights are placed in recesses in the cement just under the rail, these recesses being so shaped that the walls act as reflectors for the lamps. The space along the south wall of the repair shop will be utilized for the few machine tools required and by the emergency repair crews. Only the washing and cleaning, oiling and light repairs will be done in this shop. For general repairs the cars will be sent to the central shops of the company. The car sheds are as well lighted as the construction of the building above would permit. The bottoms of the light courts above are all provided with either sidewalk lights or skylights



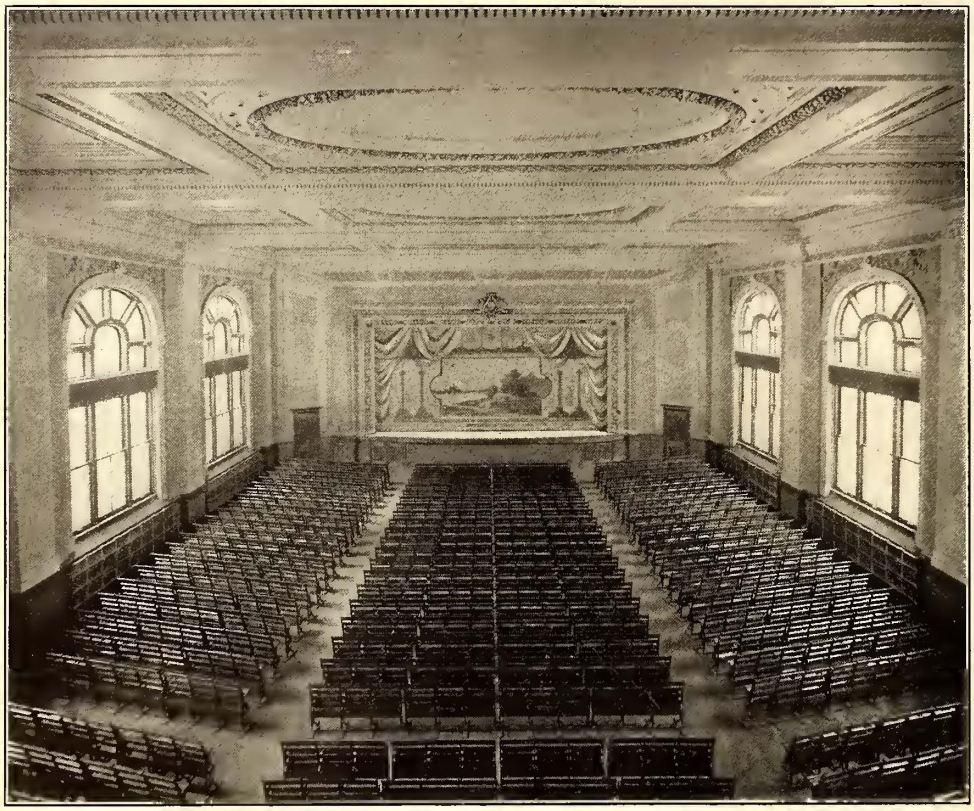
THE FOURTH FLOOR OF THE MILWAUKEE PUBLIC SERVICE BUILDING, ACCOMMODATING THE OFFICES OF THE PRESIDENT AND GENERAL MANAGER



THE THIRD FLOOR OF MILWAUKEE PUBLIC SERVICE BUILDING, COVERING MACHINERY TESTING, MEDICAL, LEGAL AND CLAIM DEPARTMENTS

of the usual type. Artificial light is supplied by individual incandescent lamps supported a few feet from the ceiling by brass electroliers.

One of the most interesting features of the car sheds is the



THE CONVENTION HALL WITH STAGE

type of door closing the openings through which the cars enter the building. These doors were designed by E. W. Olds, superintendent of rolling stock. They are double and hinged together in the usual manner, but the door as a whole is hung on a 4-in. gas pipe which projects down into the floor and up into the concrete construction above and is supported on roller bearings. A steel framework bolted securely to the gas pipe carries the door proper. This construction prevents the door twisting and adds to its strength. The upper portion of the door is provided with glass fitted in metal sash.

TRAINMEN'S QUARTERS

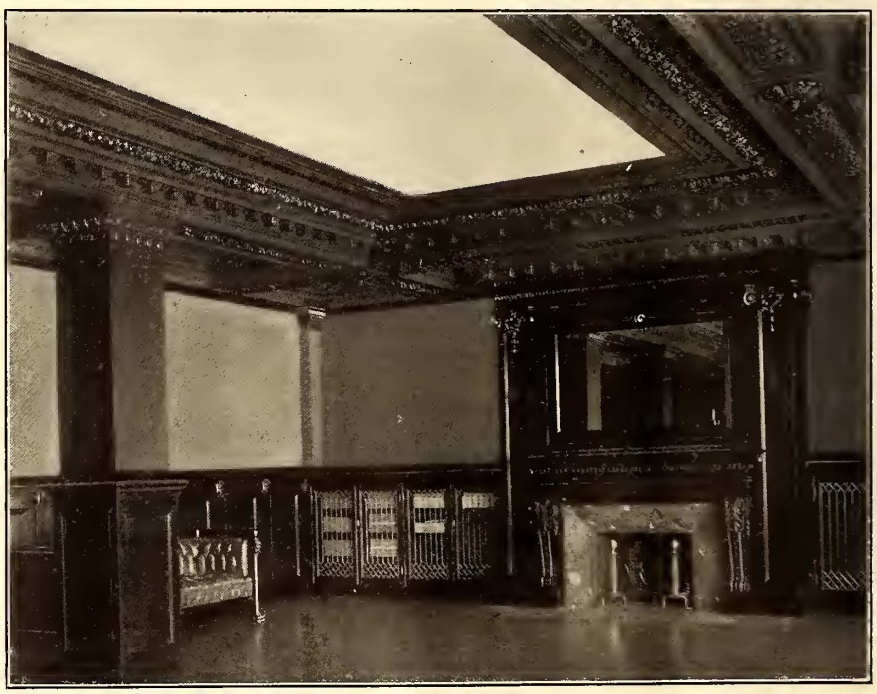
A stairway from the car house leads to the trainmen's quarters on the floor above. These rooms are adjacent to the offices of the superintendent of transportation, which occupy the northwest corner of the second floor. The headquarters of the division foreman, to whom the trainmen report, is provided with a counter and windows for each foreman. Behind this room is another provided with desks fitted with glass compartments and used by the trainmen when making out reports. A gallery above and a portion of the main floor in an adjacent room contain about 300 metal lockers for the use of trainmen, and toilet rooms of ample size are located on the opposite side of the corridor.

ACCOUNTING DEPARTMENT

The auditing and accounting department occupies the east half of the front portion of the building and also the east rear wing. For almost the full length of the front room the counter of St. Anne Italian marble is surmounted by a lacquered brass grill behind which the working force is located. The offices of F. J. Voehn, assistant secretary and treasurer, are in the northeast corner of the building. The cash vault in this department is equipped with an electrical system of vault protection which when the vault is disturbed sounds alarms both in the building and outside at either end. Tickets and transfers are counted in the east wing, where a large force of girls is kept employed for this purpose.

TRAINMEN'S CLUB ROOMS

It was the intention that the building should serve more or less as a social center for all of the employees, and to this end club quarters were provided. These rooms take up all of the east central wing on the second floor. A corridor down the middle of this wing leads to the library in the rear, while about midway of its length is a small rotunda with doors opening into the dining rooms, barber shop, and billiard rooms. Two dining rooms are provided, with a kitchen equipped with facilities for cooking both by electricity and by gas and with refrigeration from the ice machine in the base-



A CORNER IN THE DIRECTORS' ROOM, SHOWING THE RICH CARVINGS, ORNAMENTAL FIRE-PLACE, MANTEL, ETC.

ment. At one end of the library in the rear is a large fireplace, while directly opposite is the library, which is in an enclosure fitted with metal book shelves. In addition to reading matter of a general nature, the library will be well sup-

plied with technical books and magazines. The bowling alleys, which are included in the club quarters, are located in the south half of the west wing, and contain three alleys of regulation size and one pony alley. The lost article department is located in a room near the bowling alleys. Against the walls of this room are built closed cabinets reaching to the ceiling, so that articles may be kept in a systematic manner.

CONVENTION HALL

The convention hall takes up all of the first and second floors of the west central wing. The hall, which has a total seating capacity of about 1200 people, has a stage as fully equipped as that of a modern theater. The asbestos drop curtain with which it is supplied and the several others in use are raised by motors. Globes of three different colors are employed in the stage lighting, those of each color being wired in separately controlled circuits through a dimmer of the type usually found in theaters.

VIEW OF PUBLIC OFFICE OF THE PRESIDENT AND GENERAL MANAGER, TAKEN BEFORE THE INSTALLATION OF THE LIGHTING FIXTURES

MEDICAL DEPARTMENT

The medical department, in charge of Dr. C. H. Lemon, occupies five rooms on the third floor, fronting on Sycamore Street. These rooms were fitted up in a very attractive manner with the idea of encouraging men when injured to go to the company's physician rather than to an outside doctor. The walls and floor of the operating room are of Italian marble, while all of the apparatus in it is the most modern and most sanitary obtainable. The apparatus includes a standard set of American sterilizers, an operating table, dressing table, and instrument stands, all of white enameled steel.

OFFICES OF DEPARTMENT HEADS

The west wing of the third floor contains the offices of C. J. Davidson, chief engineer; of Fred G. Simmons, superintendent of way, and of E. W. Olds, superintendent of rolling stock. Across the corridor from the office of the chief engineer are the laboratories belonging to the mechanical engineering department, which, when finished, will contain machines for testing concrete, oils, coal and other materials used by the company. In the rear of the laboratories is the general draughting room for all the departments.

The electric lighting department is located on the third floor in the eastern portion of the building. In the northeast corner are the offices of O. M. Rau, superintendent of this department, and also of the electrical engineering department. The large room between Mr. Rau's offices and the central corridor of the building is used as a working office by the electrical engineering department and by the meter department, both of which are under the immediate supervision of F. A. Vaughn, assistant to Mr. Rau. The publicity department, conducted by Roscoe Moon, also has its quarters in this room. The section, devoted to the meter department is provided with racks for the storage of tested meters, and a portion partitioned off in which the meter readers, inspectors and installers report.

The testing department is just south of Mr. Rau's offices, and contains, among other apparatus, quite an elaborate testing board. One side of this board, which consists of a high panel carrying instruments and switches with a bench on either side, is used for testing of a general nature, while the other side is utilized for testing meters alone. One end of the board has facilities for testing the telephone apparatus, including that of the automatic telephones. The testing department will also be supplied with a six-phase motor generator set from which different frequencies and phases of current may be obtained, while a separate room has been reserved for photometric tests. Just north of the test room is a shop which is devoted largely to the manufacture of switchboards and electrical apparatus. This shop contains a full equipment of machine tools, including turret lathes, milling machines, drill pressers and grinders., In the basement is installed a large radial drill belonging to the shop equipment, which is used exclusively for boring switchboard panels. All of the separate tools in the shop have individual motor drive, the motors in most instances being mounted on the machines.

INSTALLATION AND REPAIR DEPARTMENT

At the rear of the test room is the installation and repair department, and opening from the large central room devoted to general work are several small ones used for different purposes. One of these contains electrically driven arc light globe washers and electro-magnetic carbon cutters. Another is equipped with several grinders and buffers used in finishing switchboard and other brass and copper work. This room is provided with an exhaust fan having tubes running to each machine. Near the rear of the building is a locker and toilet room for the employees in the shop. A freight elevator in the southeast corner of the building handles all heavy work going into and out of the shop, as well as electric meters.

In a single room near the southwest corner of the building on the fourth floor is located the printing department which prints the street railway transfers and rules, as well as all

the forms used by the company. The printing office is supplied with a Miehle 33-in. x 48-in. cylinder press, a two-color Harris automatic press for printing transfers and small forms, a double-decked ruling machine, job presses, stitching machine, perforating machine, and other machines for similar work.

PRESIDENT'S OFFICES

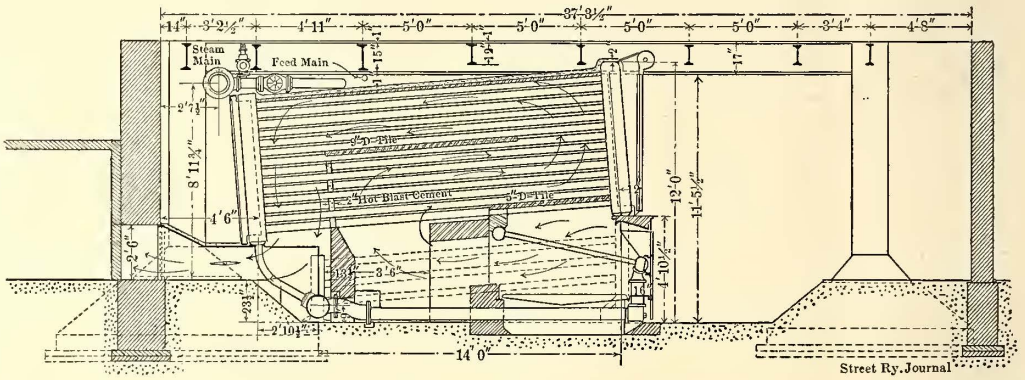
The offices of President and General Manager John I. Beggs, in the northwest corner on the fourth floor, are the most elaborately finished rooms in the building. The president's suite of offices consists of a reception room, a main office in the corner of the building, a private office to the east with a bathroom opening off from it, and a private secretary's room west of the main office. The walls of all these rooms are paneled to the ceiling in fumed oak, while the door casings are hand carved. The floors are of hardwood with a border of parquetry. The furniture, which consists of davenports and chairs upholstered in Spanish leather, book cases and desks, are of oak to match the general finish of the room. The ceiling is deeply paneled in stucco ornamented with gold leaf. Mr. Beggs' desks, a roll-top one and another with a flat top, occupy the central portion of the room. The most imposing feature of the room is probably the fireplace and mantel against the south wall of the room. The former is of marble and bronze and is provided with heavy fluted brass andirons. A clock which strikes the watches of a ship instead of the hours occupies a central position on the mantel, while ornamental electroliers are placed on either side. The office of the private secretary, adjacent, is provided with a vault for the storing of records, the metal files and cases of which were designed personally by Mr. Beggs.

A private passageway from Mr. Beggs' office leads to the directors' room just beyond the private secretary's office. This is an oblong room finished in mahogany. A paneled wainscoting is ornamented with hand-carved sphinx heads, while a mantel of imposing design takes up quite a portion of the south wall. Underneath the long central panel in the ceiling will be placed a directors' table, surrounded by Bank of England chairs. Just east of the offices of the president and general manager is the office of his chief clerk, E. B. Meissner, while the office force of the purchasing department under Mr. Meissner's supervision occupies an adjacent room.

THE BASEMENT

While the storeroom of the lighting department is located in the southern end, the greater portion of the basement is taken up by a power plant, elevator machinery, air compressors and refrigerating machines. A contract for furnishing steam to the Milwaukee Central Heating Company was primarily responsible for the installation of the power plant, which when completed will consist of ten 500-kw Edgemoor boilers and three 1500-kw Allis-Chalmers Parsons turbines. The limited amount of space available introduced several difficulties in the installation of the boilers, which are arranged in one row near the south wall of the building. Although of 500-hp, each boiler is installed in a space 12 ft. 9 ins. high and 16 ft. 5 ins. wide. An idea of the close work required to get the boiler in the space available may be obtained from the accompanying drawing showing the boiler installation. The boiler itself (not the setting, which includes the side tubes) was designed by the late William Sellen, while the setting was devised by C. J. Davidson, chief engineer of the system.

The boiler consists of a skeleton of tubes supported on legs connected by water tubes. These water tubes are provided with a fire-brick covering, and similar bricks enclose the tubes of the boiler proper. The lower tubes, together with the fire brick enclosing them, might be said to form the boiler setting, and consequently the space taken up by the usual brick furnace walls is saved. The limited head room made the use of a steam drum out of the question, and the steam is taken directly from the rear header of the boiler and only about 15 ins. above the water level. Immediately in front of the line of boilers and projecting out under the sidewalk is a space for coal storage, the coal being dropped through manholes in the sidewalk above. Two stacks built of blast furnace slag, each 150 ft. high and 9 ft. in diameter, serve the boilers. The stacks project up through the building, and special construction was carried out to lessen the heat radiation. Each is enclosed in a brick wall with air space between, the stock proper and the enclosing wall entirely independent of each other to allow for difference in



DETAILS OF BOILER SETTING

the expansion and contraction. The boilers are fed by two Worthington 14-in. x 8½-in. x 15-in. center-packed piston plunger pumps installed in connection with two 1500-hp Hoppes heaters.

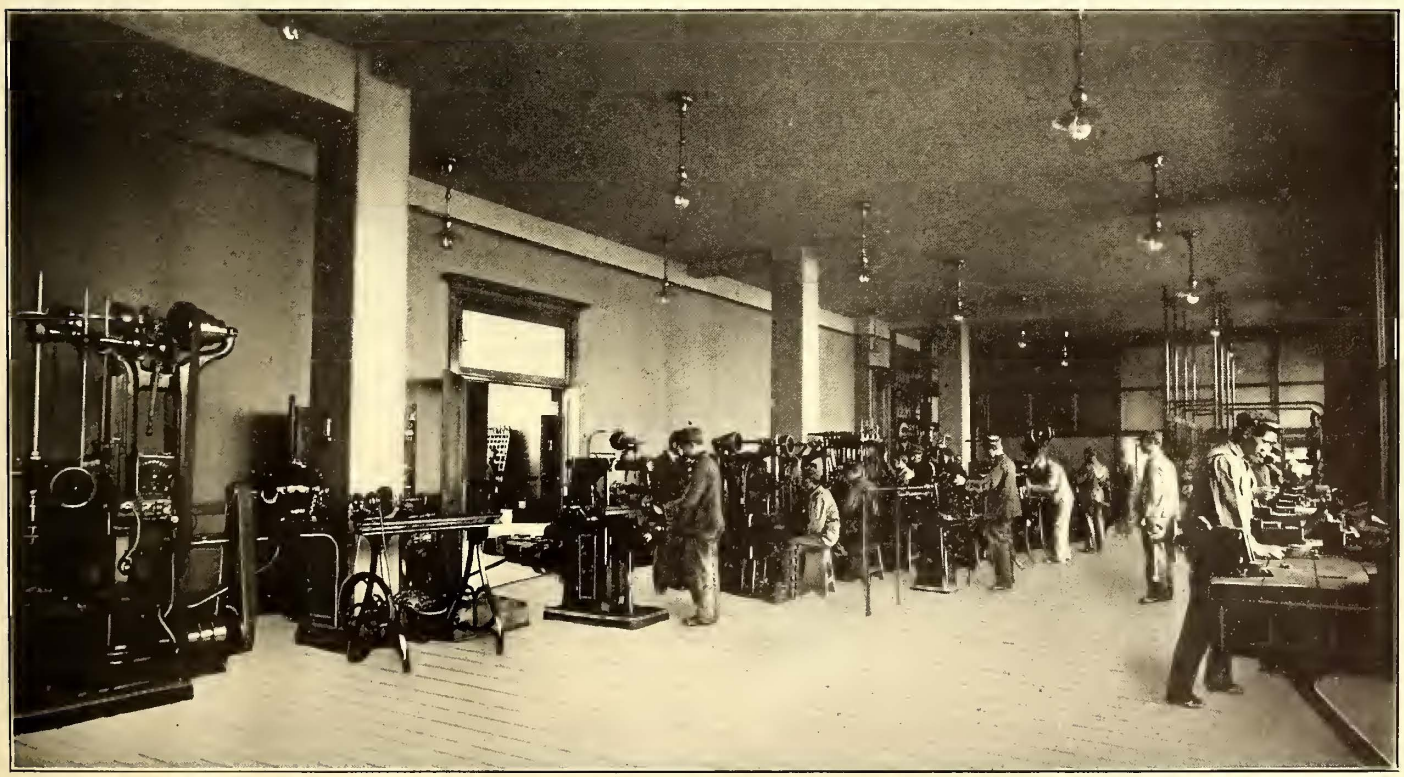
EXHAUST STEAM TURBINES

As power could be obtained at a comparatively low cost by passing the steam through engines before turning it into the heating mains leaving the building, the three 1500-kw turbines already mentioned will be installed in the central portion of the building. These turbines are specially constructed to operate non-condensing, and in fact, they will operate with a back pressure of 7 lbs. With this pressure, which is equivalent to 22 lbs. absolute back pressure, and with 150 lbs. pressure at the throttle, these turbines have a guaranteed consumption of 44 lbs. of dry steam per kilowatt-hour at three-fourths load, 40 lbs. at full load, and 41 lbs. at one-fourth overload. The generators driven by the turbines are of the Bullock type, 2300-volt, 60-cycle, three-phase, with an exciter mounted on the same shaft. Part of the alternating current generated will be sent out of the station without being transformed, but the greater portion of it will be supplied through two 1500-kw motor generator sets to the direct-current Edison system feeding the business district of the city. A storage battery installed in the basement is floated on the Edison system. The battery consists of 320 G-39 chloride cells, and is provided with end-cell switches and connections. Space has been left near the center of the

building for another battery of twice this size when the growth of the system demands. In connection with the battery there is installed a 150-kw booster set.

MOTOR-TESTING SIDE OF TEST BOARD IN TESTING ROOM

TWO OF THE 500-HP BOILERS IN THE BASEMENT



GENERAL VIEW OF MACHINE SHOP ON THIRD FLOOR, SHOWING INDIVIDUAL MOTOR DRIVE

The switchboard for all the electrical apparatus in the basement and also for lighting the building is located under the Sycamore Street side of the walk.

The boilers in the basement and the turbines will only be operated during the winter season when steam is required in the heating mains. For furnishing a summer load on these, provision has been made for the installation of two 100-ton steam-driven ammonia refrigerating plants, it being the idea to furnish refrigeration to hotels, cafes and other places of business in the immediate district. At present one 28-ton Vilter Manufacturing Company's motor-driven ice machine

is installed, which is used to cool the spring water in the tanks in the basement and to furnish refrigeration to the kitchen and the lunch counter in the waiting room. Two 150-ft. motor-driven Christensen air compressors are installed near the ice machine. These compressors maintain a constant air pressure in four tanks near by, which are used to operate the pneumatic tube system in the building, the pneumatic tools and the heat regulating system, and to open elevator doors. All the elevators are electrically driven, the machinery being located in the basement. The two passenger elevators are said to be the first drum-type, electrically driven elevators, and have a speed of 600 ft. per minute. They are operated by hoists manufactured by the Barth Manufacturing Company, and are built for 1500 lbs. load. Two freight elevators, one in each of the rear corners of the building, are built for 4000 lbs. and travel at 250 ft. per minute. In addition to the elevators mentioned there are also two sidewalk hoists and a hoist from the storeroom of the electric lighting department to the salesroom above.

PIPE SHOP

The basement also contains a shop for cutting, bending and threading pipe. All work of this nature for the entire system will be done in this shop, which is equipped with Bagnall & Keeler pipe machines, Baker tapping machines, and a pipe-bending machine.

DESIGN AND CONSTRUCTION

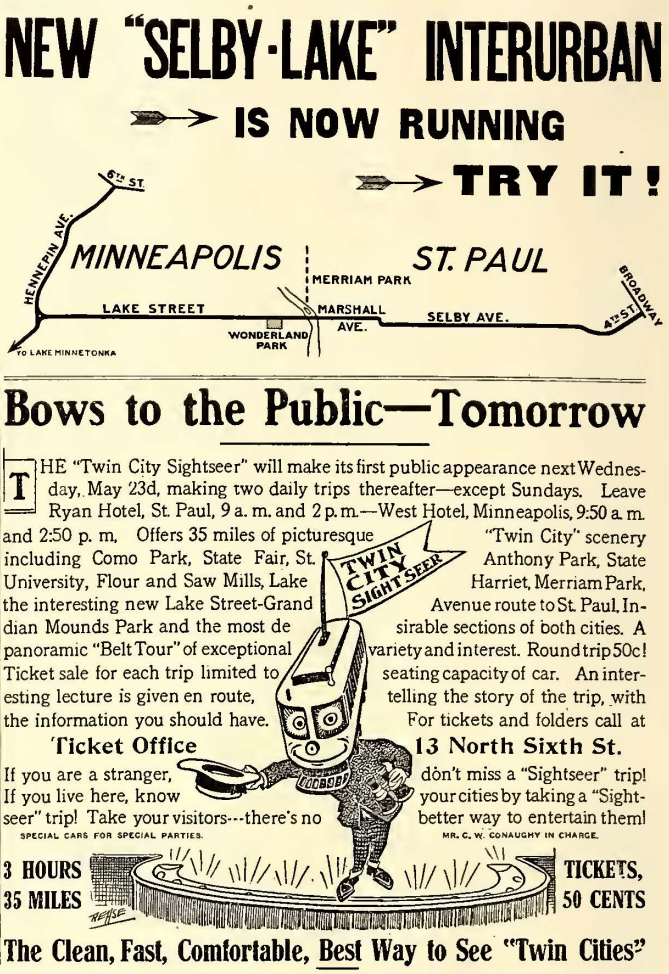
Throughout the design and the construction of the building Herman J. Esser, of Milwaukee, was retained as architect. All the detailed parts of the building, even to the desks, mouldings and furniture, were drawn up and submitted to Mr. Beggs for approval before being ordered, and it is due to the personal interest taken by Mr. Beggs in all the details of the design and construction of the building that it so well answers the purposes for which it was intended.

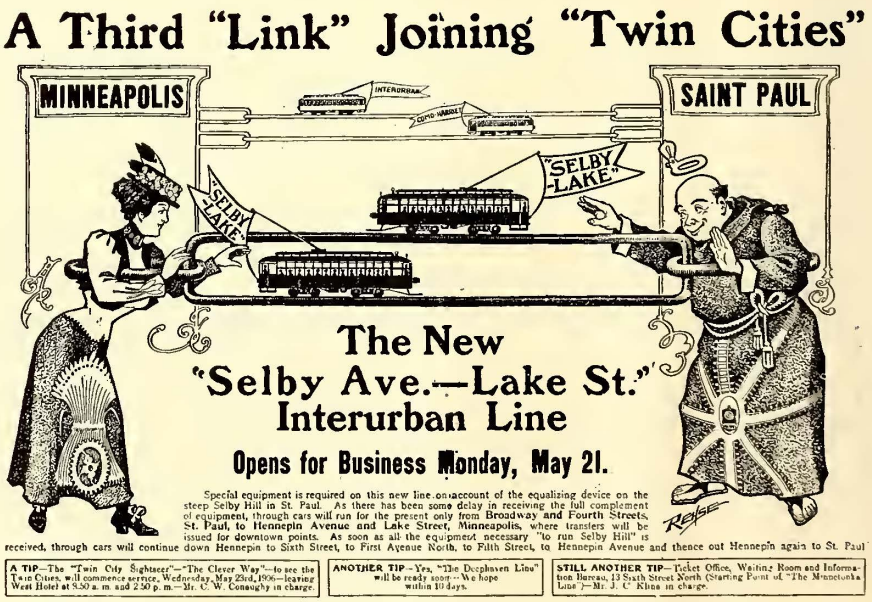
DEVELOPING PLEASURE TRAVEL IN THE TWIN CITIES

As announced in these columns recently, the Twin City Rapid Transit Company, operating the city and interurban systems in and about St. Paul and Minneapolis, has established a traffic-creating department in charge of A. W. Warnock, the company's first general passenger agent. Examples of the activity of this department are shown in the accompanying cuts, which are fac-similes of three newspaper advertisements to acquaint the public with new features in the service.

When the Twin City Rapid Transit Company opened a third interurban line between Minneapolis and St. Paul the fact was announced by half-page advertisements in the newspapers. The figures representing the city of St. Paul as a monk and Minneapolis as a good-looking, up-to-date young woman are typical of the two cities and well known as such by Twin City people. This new link is of special importance as it penetrates the most desirable sections of both cities. That the company believes in giving the public some hint of construction difficulties may be noted by its reference to a special device on the steep grade on Selby Hill in St. Paul. The grade on this hill is 16 per cent, and an equalizing device with the counter-weight system is required. A number of "tips" are also given with reference to other traffic matters of public interest. The cars for this service are 47 ft. long, 9 ft. 8 ins. wide, and seat 52 passengers. They are unusually roomy and comfortable. As they are products of this company's own shops the company feels particularly gratified with their beauty and excellence.

Coincident with the opening of the new line, the company is putting on its sightseer cars, the first of which includes a panoramic trip of 35 miles in three hours for fifty cents. In addition to the newspaper advertisements the company also celebrated the opening of the new interurban line by placing large colored cards in all of its car windows.



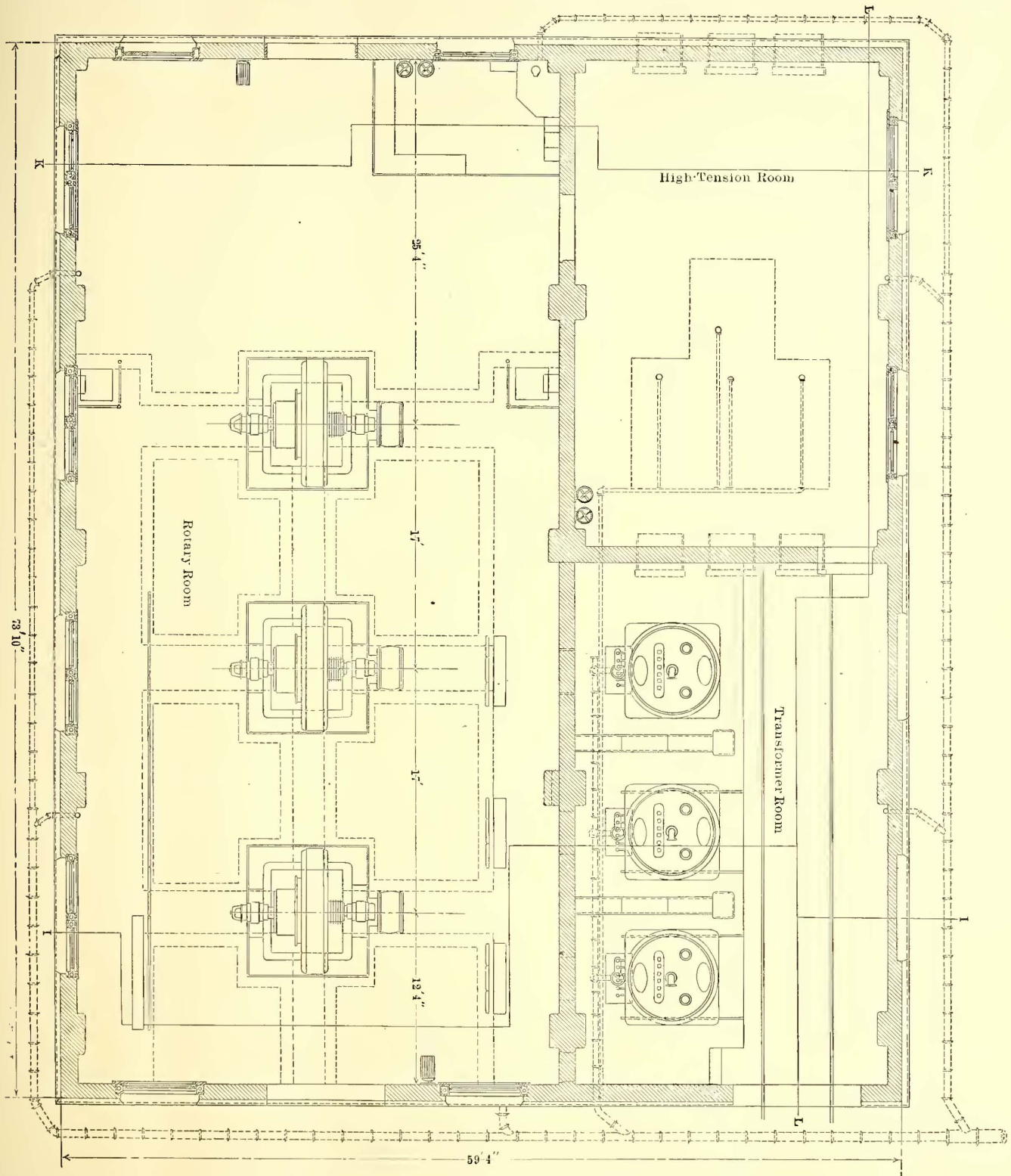


NEWSPAPER ADVERTISEMENTS OF THE TWIN CITY RAPID TRANSIT COMPANY'S NEW ROUTE BETWEEN MINNEAPOLIS AND ST. PAUL

THE 60,000-VOLT SUB-STATION AND TRANSMISSION LINE OF THE SYRACUSE RAPID TRANSIT COMPANY

The taking of 60,000-volt current generated at Niagara Falls into the city of Syracuse, exclusively for electric railway purposes, marks a noteworthy epoch in electrical development in the East. The transmitting distance is approximately 165 miles, and the Syracuse installation comprises one of the important plants in the comprehensive scheme now under way for supplying the central portions of New York State with hydro-electric power developed in the Niagara region.

The power delivered at Syracuse will be utilized by the Syracuse Rapid Transit Company for operating its traction system in that city. This system now comprises 80 miles of track, upon which the number of cars operated per day averages 85, and the number operated at peak hours is 110. The total power requirement for moving all schedules is approximately 36,000 kw-hours per day. Until the arrangements for Niagara Falls power were carried through the property was operated from one somewhat antiquated direct-current generating station, whose total output capacity has for some time been seriously overtaxed by the increasing demands for power brought about by the increase in the company's traffic. It is the intention after Falls power is available to hold this station in reserve for emergencies.



PLAN OF SUB-STATION OF SYRACUSE RAPID TRANSIT COMPANY

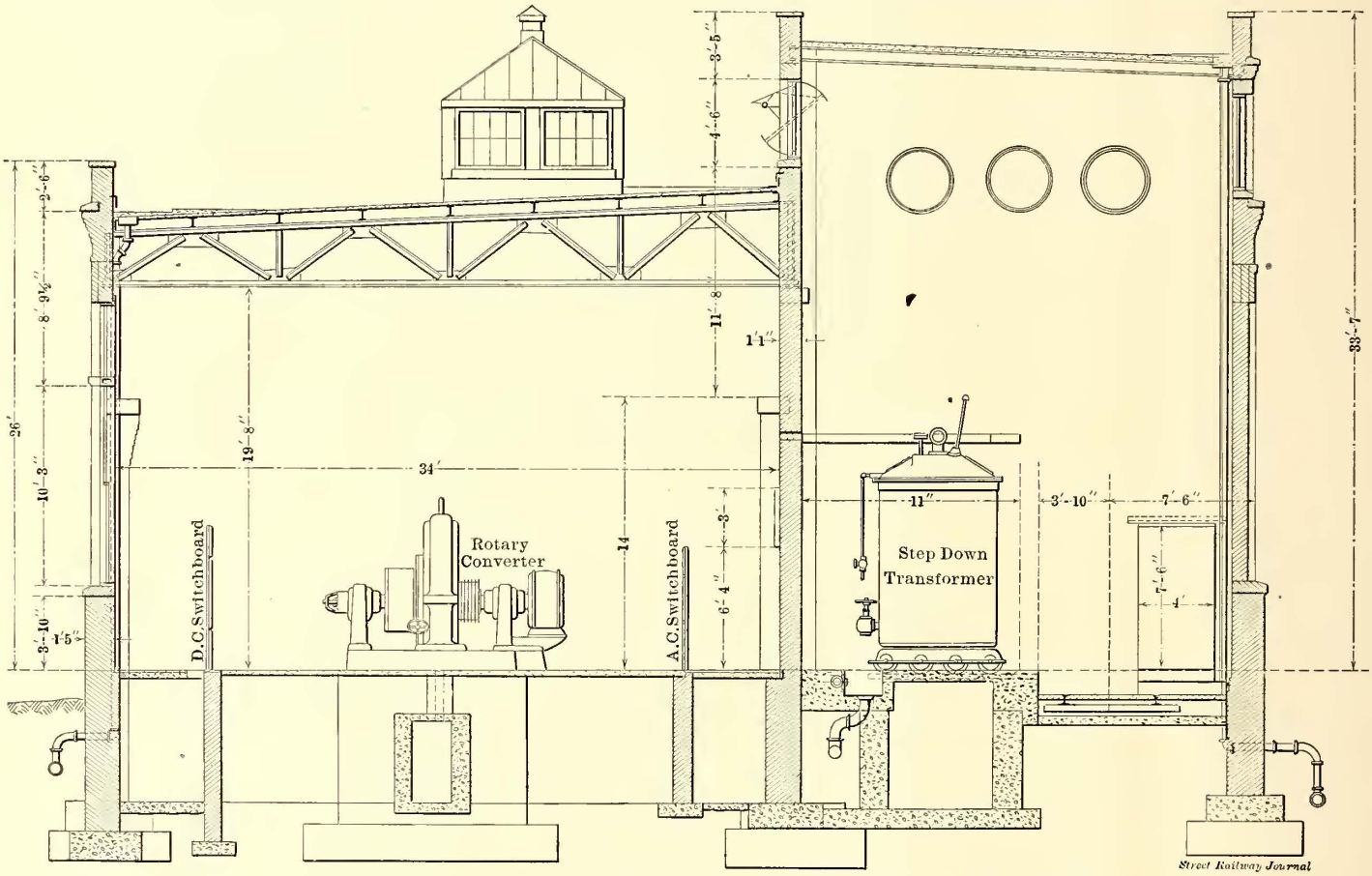
Briefly outlined, the new installation at Syracuse embodies the following features. Current is generated at the Niagara Falls (Canada) hydro-electric plant of the Ontario Power Company, and is delivered to the transmission lines of the Niagara Falls, Lockport & Ontario Power Company, which is the transmitting company, as 60,000-volt, three-phase, 25-cycle current. This current is delivered at the city line of the city of Syracuse to the transmission line of the Syracuse Rapid Transit Company at approximately 55,000 volts (based upon an estimated transmission loss of 8 per cent for the total distance of 160 miles). From the city limits the Syracuse Rapid Transit Company carries the current at this voltage over its own high-tension line, located along the Erie Canal, to its own sub-station, which has been built on the banks of the canal near the present power house of the company, about two miles from the receiving point at the city limits. In the sub-station the current is stepped down at one operation in lowering transformers from 55,000 volts to 430 volts a. c., thence passed through rotary converters and delivered to the railway feeders as 600 volts d. c.

The sub-station building is 74 ft. 6 ins. x 60 ft. outside measurement, and the interior is divided by brick partition walls into three divisions: The high-tension room, 22 ft. 1 in. x 33 ft. 11½ ins.; the transformer room, 22 ft. 1 in. x 36 ft. 7½ ins., and the rotary converter room, 71 ft. 8 ins. x 34 ft., inside measurements.

The building is built of pressed brick with steel roof framing. The sub-station roof consists of concrete slabs made as follows: The slabs were cast in a wooden form or mold the bottom of which was constructed of matched planks surfaced on inner side and spiked to cross-pieces so as to hold it in a true plane. A ½-in. layer of cement mortar, consisting of a 1-2 mixture, was spread on the bottom of the form, and the reinforcing, which is expanded metal (No. 10 gage and 3-in. mesh and 5-32-in. strands) was laid on this bed of mortar. The remaining 2½ ins. were filled with cinder concrete well tamped and troweled on the top surface. The cinder concrete was a 1-2½-5 mixture. As soon as the slab could be handled it was removed from the mold and the bottom surface was fixed up if it was found to be too rough. The slabs were laid with the long way of the mesh in the expanded metal, extending with the span. The slabs are 4 ft. 1 in. wide, 4 ft. 5⅞ ins. long, and 3 ins. thick.

The floor of the sub-station is concrete throughout, with concrete ducts and conduits in and beneath the floor for the cables and wiring.

The Westinghouse Electric & Manufacturing Company had the contract for delivering and installing all the sub-station apparatus, including the necessary bus-bars and wiring between transformers, switches and rotary converters.



CROSS SECTION OF SUB-STATION OF SYRACUSE RAPID TRANSIT COMPANY

The course of the cables through the sub-station may be traced from the drawings, and is substantially as follows:

The three high-tension cables drop from an anchor tower located 10 ft. from the west wall of the sub-station building to anchor insulators supported on angle-iron brackets projecting from this wall. From these insulators the cables pass through the wall of the building to a second set of insulators on the inside wall corresponding to those on the outside wall. Continuing on the same level in the upper part of the high-tension room, each cable passes to an inverted insulator suspended from the roof members (the taps to the high-tension lightning arresters being taken off just before the inverted insulator is reached). From the last mentioned insulator each cable makes a sweeping bend downward to the high-tension cut-out switches which are carried on an angle-iron girder supported from the side walls of the high-tension room. From the cut-out switches the course of the cables is down to the 60,000-volt oil circuit breakers, thence to the

series transformer, and thence to the static interrupter, all of which are located in the order named on the floor of the high-tension room. From the static interrupter the cables rise along the partition wall of the high-tension room, then turn and pass through the partition wall into the transformer room and thence to the three 60,000-volt lowering transformers. The high-tension cables within both the high-tension and transformer rooms are enclosed in ⅜-in. standard brass tubing. From the top of each transformer the low-voltage a. c. taps pass through the transformer-room partition wall into the rotary converter room and thence directly to the low-tension a. c. switchboard in the rotary room. Thence the cables drop below the floor, and by short runs through concrete ducts reach the a. c. sides of the respective rotaries. From the d. c. sides of the rotaries the cables again drop below the floor, pass by short runs through concrete ducts, and come up at the back of the d. c. switchboard. Thence

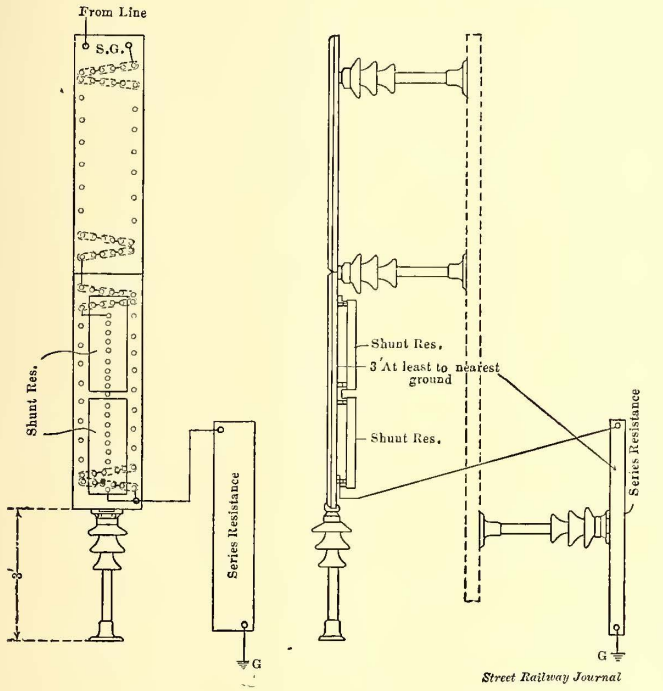


DIAGRAM OF CONNECTIONS FOR LOW EQUIVALENT A. C. LIGHTNING ARRESTER, 60,000 VOLTS—SYRACUSE SUB-STATION

the d. c. feeders fan, pass through wall insulators in the outside wall of the building and are distributed on feeder racks supported on poles located 12 ft. outside the south wall.

The method of bringing the high-tension cables into the sub-station building is somewhat unique. At the point of entry the building wall is pierced with three sections of 36-in. vitrified pipe, one for each leg of the three-phase circuit. Within each pipe is set a circular disc of ½-in. plate glass, each plate having a 3-in. hole through its center through which passes one cable of the circuit. The disc of plate glass takes the place of the more common method of filling the vitrified pipe with cement.

The high-tension room contains the protective and switching devices for handling the high-voltage current. The equipment in this room includes three 60,000-volt low equivalent lightning arresters; one 50-amp., 60,000-volt, three-pole electrically operated automatic oil switch with time-limit relay; three 1000-kw, 60,000-volt static interrupters, and the necessary cut-out switches, which are single-throw, hook type, 50-amp., 60,000-volt capacity.

A 50-cell, 40-amp. hour storage battery with necessary incandescent lamps, switches, etc., is provided for operating the various electrically controlled switches in the station.

TRANSFORMERS

The transformer room contains three single-phase, oil-insulated, water-cooled, high-duty 1000-kw lowering Westinghouse transformers. These transformers are designed for operation in oil, and the cooling is effected by means of water, circulated through cooling coils placed beneath the surface of the oil. The shell-form construction is employed, the iron laminations being placed in a horizontal plane. The transformers are designed to operate on a circuit having a frequency of 25 cycles per second. The high-tension winding is designed for a normal e. m. f of 55,000 volts, with provision for three additional voltages. The low-tension winding is designed for a normal e. m. f. of 430 volts, with provision for additional voltages.

Each transformer may be operated singly at any of the above voltages, or as one of a group of three transformers, connected in delta to change from the high-tension voltages, three-phase, to the low-tension voltages, six-phase. Each low-tension winding consists of three separate coils for supplying current to the three rotary converters, when the transformers are connected on three-phase circuits.

Each transformer is mounted in a cylindrical boiler-iron case, mounted upon a cast-iron base, and provided with a cast-iron cover, through which the terminals are brought out. The case measures 9 ft. 2 ins. from top of base to bottom of cap, and is 6 ft. 3½ ins. in diameter. A thermometer is provided near the top of the case for indicating the temperature of the surface oil. The thermometer is supplied with an electrical contact device for operating an alarm should the temperature of the oil become excessive. A valve is provided at the bottom of the case, by means of which, in case of fire or other emergency, the oil may be quickly withdrawn and run into a sewer. The cooling coils are of seamless brass tubing, spiral in form, and placed near the top of the oil. The coils were subjected to a factory test of 150 lbs. per sq. in., hydraulic pressure. The transformers have ventilating ducts of ample dimensions between coils, and at frequent intervals in the laminated cores, thus insuring a uniform temperature throughout the interior of the apparatus. The core consists of sheet steel of high magnetic quality, thoroughly annealed and specially treated to prevent aging.

The transformer efficiencies are guaranteed as follows:

One-quarter load	94.2 per cent
One-half load	96.6 per cent
Three-quarter load	97.0 per cent
Full load	97.1 per cent
One-quarter overload	96.96 per cent

These efficiencies are based on single-phase operations at normal kilovolt-ampere rating, and at a ratio of transformation of 55,000 to 430 volts.

With constant voltage on the primary, and with the secondary delivering normal kilovolt-ampere output, the rise in secondary voltage, when the load is thrown off, is guaranteed not to exceed the following values, the percentages being based on the full load voltages: Regulation, 100 per cent power factor ⅛ per cent; 80 per cent power factor, 3.5 per cent.

The rise in temperature above the entering water is guaranteed not to exceed 40 degrees C. at normal full load on twenty-four hours' run with 5 gallons of water per minute; at one-quarter overload under same conditions the rise will not exceed 55 deg. C.

Before leaving the factory, the insulation from the high-tension windings to the low-tension windings and iron was subjected to a test of 120,000 volts alternating current for three seconds, and the insulation from the low-tension wind-

ing to iron was subjected to a test of 10,000 volts alternating current for the same period.

The weights of the different parts of the transformer are approximately as follows: Coils and iron, 9900 lbs.; case and fittings, 6600 lbs.; oil, 6800 lbs.; total, 23,000 lbs.

Each transformer is housed in a separate brick partition which is open at the front. For convenience in installing the transformer cases are mounted on wheels designed to run on rails laid on the floor of the transformer room.

ROTARY CONVERTERS

In the converter room are three 8-pole, 1000-kw, 600-volt (d. c.), six-phase, 3000 alternations (25 cycle) Westinghouse rotary converters. The collector rings are connected for six-phase current at approximately 430 volts. The normal full load rating of each machine is based on a direct-current load of 1667 amp. at 600 volts.

At the normal direct-current voltage, the power factor of the alternating current being 95 per cent or higher, the efficiencies of the converters are guaranteed as follows:

At one-quarter load	89.5 per cent
At one-half load	94.5 per cent
At three-quarter load	95.5 per cent
At full load	96.0 per cent
At 25 per cent overload	96.25 per cent
At 50 per cent overload	96.4 per cent

Each machine is guaranteed to operate for twenty-four hours at normal full-load rating with a rise in temperature in armature and field coils not to exceed 35 deg. C.; at 50 per cent overload for three hours, the rise in temperature will not exceed 60 deg. C.

The fields of the converters are compound wound, the shunt being arranged for self or separate excitation.

After completion, the insulation of the field coils from the frame was subjected to a puncture test of 5000 volts alternating current for a period of one minute.

The armature is of the slotted drum type. The core is built of laminated steel of high magnetic quality, and the sheets of steel are dovetailed accurately to the spider. The laminated core thus built up is held firmly between two end plates. The armature winding consists of strap-wound coils formed and insulated before being placed in the slots. The coils are held in the slots by retaining wedges of hard fibre. The insulation of the armature conductors consists of sheet material of high insulating quality applied in overlapping layers. This is held in place with tape, and the whole is treated with a moisture-proof and oil-proof compound. After completion, the insulation of the armature winding from the core was subjected to a puncture test of 3500 volts alternating current for a period of one minute.

The commutator bars, which are of the usual form, hard-drawn copper, with mica insulation, are held in position at one end by a cast-iron ring having a V section, and at the other end by a steel ring of a similar section firmly held in position by bolts. The brush-holders are of the sliding shunt type.

For securing thorough ventilation, large and open ventilating ducts are provided throughout the armature spider core and windings. The design of the rotating armature is such as to set up a forced circulation of air through these ventilating spaces. Space is left between the field coils so that a free circulation of air is maintained while the machine is in operation. The end windings of the armature are so arranged that the air will circulate freely among them, thus keeping their temperature low.

Each rotary is fitted with an oscillator to maintain a slight lateral motion of the armature and thereby prevent ridging of the commutator.

For starting, each rotary converter has an induction motor, known as type "C," with its revolving part mounted directly upon an extension of the converter armature shaft. This motor will be used for bringing the armature up to synchronous speed. The starting motor is so designed as to make the operation of starting, accelerating and synchronizing produce a minimum disturbance in the voltage of the supply circuit.

SWITCHBOARDS

The a. c. switchboard consists of one a. c. load panel, three a. c.-d. c. rotary panels, and one d. c. load panel.

The a. c. load panel consists of three blue Vermont polished marble slabs, 2 ins. thick, with ½-in. beveled edges. The top slab is 20 ins. long, 24 ins. wide; main slab 45 ins. long x 24 ins. wide, and lower slab 25 ins. long x 24 ins. wide. Upon this panel are mounted one lamp, brackets and shade; one long scale type F ammeter; three ammeter plug switches; one long scale type F voltmeter; one three-phase integrating totalizing wattmeter; one automatic synchronizer; one switch for controlling automatic, electrically operated main switch; one time-limit relay for the above switch, and one voltmeter shunt transformer.

The three rotary panels each consist of three marble slabs similar to the a. c. load panel. Upon each panel are mounted one lamp, bracket and shade; one 2000-amp., single-pole, type C circuit breaker; one 300-amp., type D, direct current ammeter; one three-phase power factor meter; two 2000-amp., single-pole, single-throw knife switches; one synchronizing switch to control electrically operated rotary switch; one three-pole knife battery switch; one voltmeter plug receptacle; one rotary converter rheostat and hand wheel for operating the same; and three 2000-amp, 600-volt d. c. recording wattmeters.

The direct current load panel consists of three marble slabs, the same as the rotary panel, excepting that they are 20 ins. wide instead of 24 ins. Upon this panel are mounted one 750-volt differential type E voltmeter, and one 12,000-amp., type E d. c. ammeter, complete with shunt.

In addition to the above there is a 2000-amp., single-pole, single-throw equalizing switch mounted upon one side of each rotary frame. A three-pole switch is also mounted upon the motor end of each rotary converter to control the starting motor.

The railway d. c. feeder switchboard consists of twelve blue Vermont marble panels, each panel being 2 ins. thick and comprising three slabs, the top slab measuring 20 ins. high, the lower slab 25 ins. high, and the middle slab 45 ins. high. Panel A, which controls a 2000-amp. railway feeder, is 20 ins. wide, and has the following apparatus. One lamp bracket and shade; one 2000-amp., 750-volt carbon break circuit breaker; one 2500-amp., type D ammeter; one 2000-amp., single-pole, double-throw, type D knife switch. Panels B, C and D are duplicates of panel A.

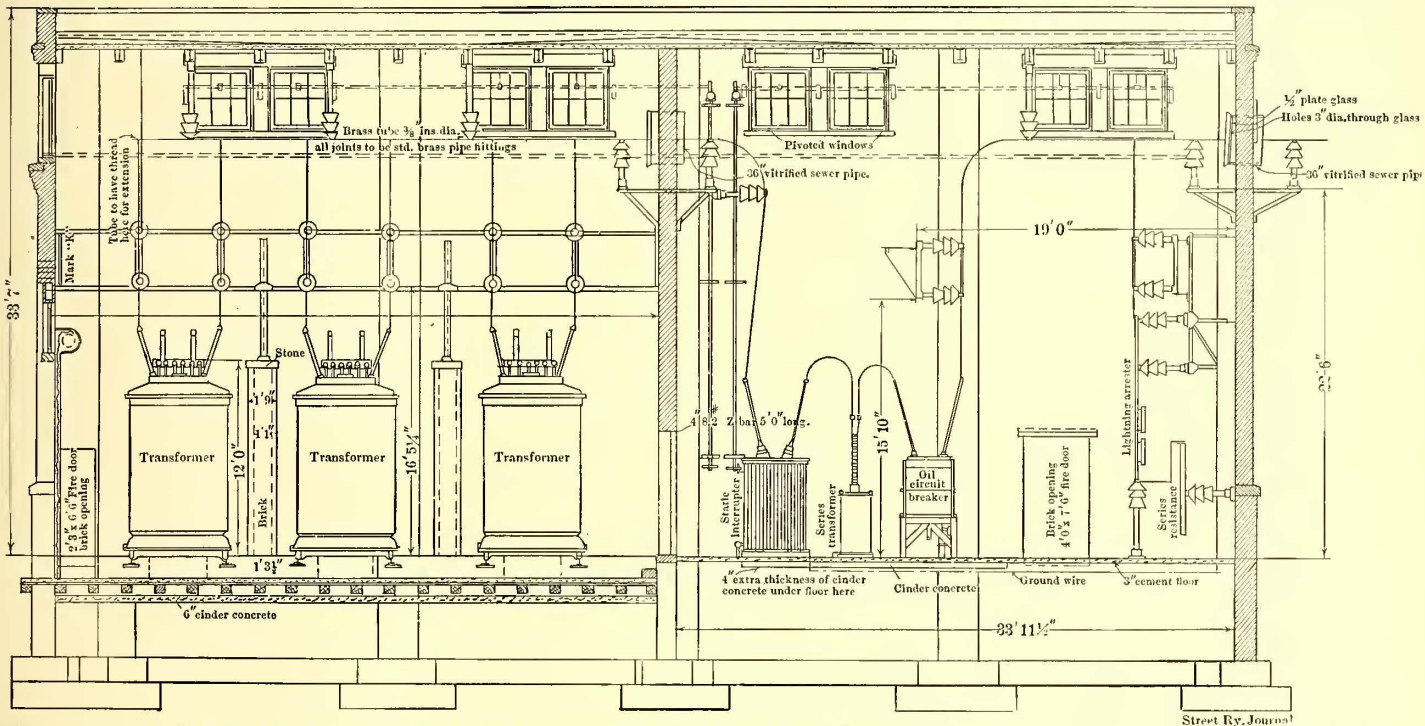
Panel E, which controls a 1500-amp. railway feeder, is 20 ins. wide, and has mounted upon it the following apparatus: One lamp bracket and shade; one 1500-amp., 750-volt., carbon break circuit breaker; one 2000-amp., type D ammeter; and one 1500-amp., single-pole, double-throw, type D knife switch. Panels F, G and H are duplicates of panel E.

Panel I, which controls two 1000-amp. railway feeders, is 24 ins. wide, and has mounted upon it the following apparatus: One lamp bracket and shade; two 1000-amp., 750-volt, carbon break circuit breaker; two 1500-amp., type D ammeters; two 1000-amp., single-pole, double-throw, type D knife switches. Panels J, K and L are duplicates of panel I.

Panel A is so connected that by closing the knife switch in the downward position it will supply current by means of the auxiliary bus-bar to each of the feeders, providing the switches to which these feeders are connected are also closed in the downward position. When so connected, this panel will be used only as an auxiliary panel to control feeders with a total capacity of 2000 amps.

With the d. c. switchboard are included main copper bus-bars of ample size to supply current to all of the feeders; an auxiliary bus-bar of 2000-amp. capacity, and all necessary detail wiring for instruments, etc. The complete switchboard is supported by a substantial iron framework.

The sub-station was designed by E. J. Cook, chief engineer of the Cleveland Electric Railway Company. The Syracuse Rapid Transit Company, of which Horace E. Andrews is president; J. J. Stanley, vice-president, and J. E. Duffy, general superintendent, let the contracts for the sub-station and transmission line, and the work has been carried out under its supervision. The construction of the sub-station was commenced Feb. 1, 1906, and it is anticipated current will be turned on about the 15th of the present month.



SECTION THROUGH HIGH-TENSION ROOM AND TRANSFORMER ROOM, SHOWING COURSE OF WIRING SYRACUSE SUB-STATION

THE TRANSMISSION LINE

As stated, the Syracuse Rapid Transit Company receives the current at approximately 55,000 volts from the Niagara, Lockport & Ontario Power Company at the western city line of the city of Syracuse, and transmits it at this voltage through the city of Syracuse for a distance of two miles over its own high-tension line to its new sub-station on the bank of the Erie Canal at Tracy Street. The route of the transmission line within the city limits of Syracuse, as will be seen from the map on page 75, beginning at the sub-station, crosses the canal and follows the berm side of the canal for a distance of 1500 ft. The line then again crosses the canal and is located on the towpath side for a distance of 6000 ft., when it leaves the canal and runs across country to the city limits, where connection is made with the transmission line of the power company. The line crosses over three railroads and several factories and buildings. The Archbold-Brady Company, of Syracuse, acted as engineer and contractor for the work.

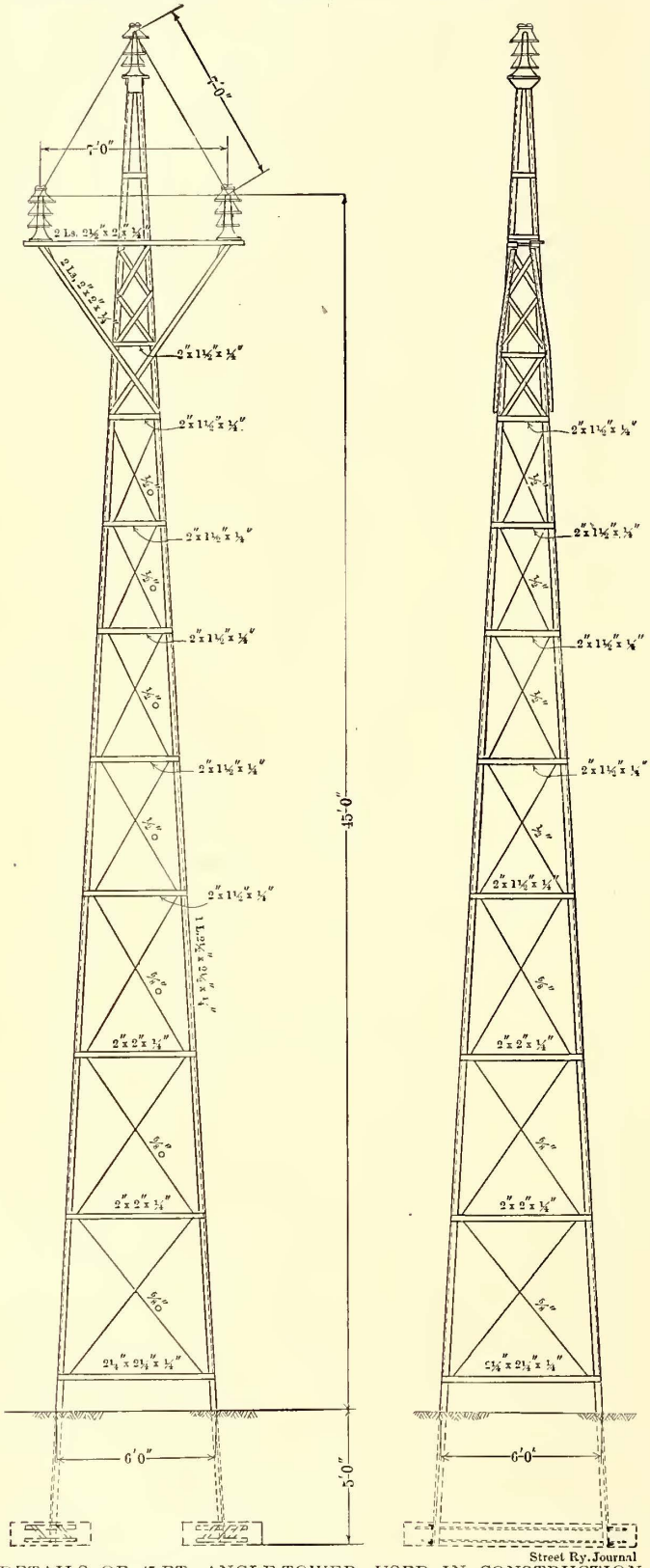
The line is carried entirely on steel towers especially designed by the contractor. There are forty of these towers on the route, the towers ranging from 45 ft. to 63 ft. in height, measured from the ground to top of bottom insulator. The total length of the towers in each case is from 10 ft. to 11 ft. longer than this when the sections entering the ground and extending above the bottom cross-arm are included.

An unusual feature of the work is the use of steel cable for the conductors. Each leg of the three-phase circuit consists of a seven-strand, 7-16-in., plow-steel cable. Each cable is strung in one length from the terminal at the sub-station to the terminal at the city line. Steel was used in these cables in place of copper or aluminum, primarily for greater strength. The average span is approximately 240 ft., the longest single span being 407 ft.

The insulators are 60,000-volt., triple-petticoat, porcelain type, supplied by R. Thomas & Sons Company, of East Liverpool, Ohio. The insulators are carried on the cross-arms by means of special malleable-iron pins designed by the contractor. The form of the pin is shown in the accompanying drawing. It will be noticed that the pin has a flat base designed to set squarely upon the cross-arm, to which it is bolted by means of four ⅝-in. bolts. This method of attaching the pins to the towers was adopted for greater convenience in installing. The parts of the insulators are cemented together and the insulators are connected by the pins. At the double cross-arm and dead-end towers the cables are clamped to equalizing saddles cemented to top of insulators. The saddles are arranged to facilitate removing a broken or defective insulator.

In designing the line the assumed wind load was taken as 1¼ lbs. per lineal foot of cable. This estimate was based on a wind pressure of 30 lbs. per ft. on a flat surface, or 15 lbs. on a round surface. The dead-end towers were designed also to provide for endwise strains under maximum wind and sleet loads, and calculating these strains, a sag not exceeding one-twentieth of the span was allowed. The minimum sag allowed was 1 ft. in 40 ft. The heights of towers was arranged to provide ample clearance over buildings and wires. The towers at the angles were designed to provide for side strains due to the tension in the cables based on the sags started, and

also for the pressure of the wind on the cable and on the tower. Enough insulators were provided at the angle towers so that the cable does not make any angle of over 8½ degs. on any one insulator. Where possible, the cable was slacked off on spans adjacent to angles of over 3 degs. The towers



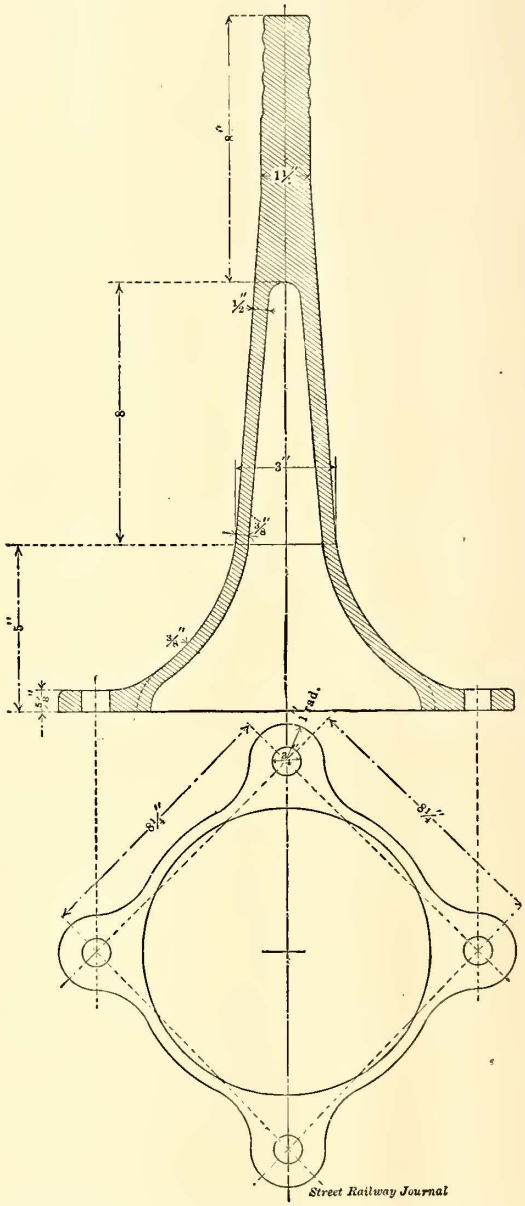
DETAILS OF 45-FT. ANGLE TOWER, USED IN CONSTRUCTION OF 60,000-VOLT TRANSMISSION LINE OF SYRACUSE RAPID TRANSIT COMPANY

at angles and dead-ends are stiff structures designed to provide for the greatest assumed strains.

The design of towers in general is shown in the drawing of 45-ft. tower herewith. In towers of greater height the section of upright members in lower panels was increased. The cross-arms of all towers were designed to resist torsional strains due to the pull of the cable on the tops of insulators. The maximum pull allowable with assumed unit strains on a single cross-arm tower was 1000 lbs. for each cable. The cross-arms of towers at dead-ends carry three insulators for each cable, and are designed to resist the maximum calculated pull due to the assumed conditions of load and sag. Bolted joints in the main members of towers were designed on the basis of 10,000 lbs. shearing per sq. in. and 20,000 lbs. bearing per sq. in.

The following are the chief features of the towers:

The towers are of the four-leg type and are built up of



DETAILS OF INSULATOR PIN FOR 60,000-VOLT TRANSMISSION LINE OF SYRACUSE RAPID TRANSIT COMPANY

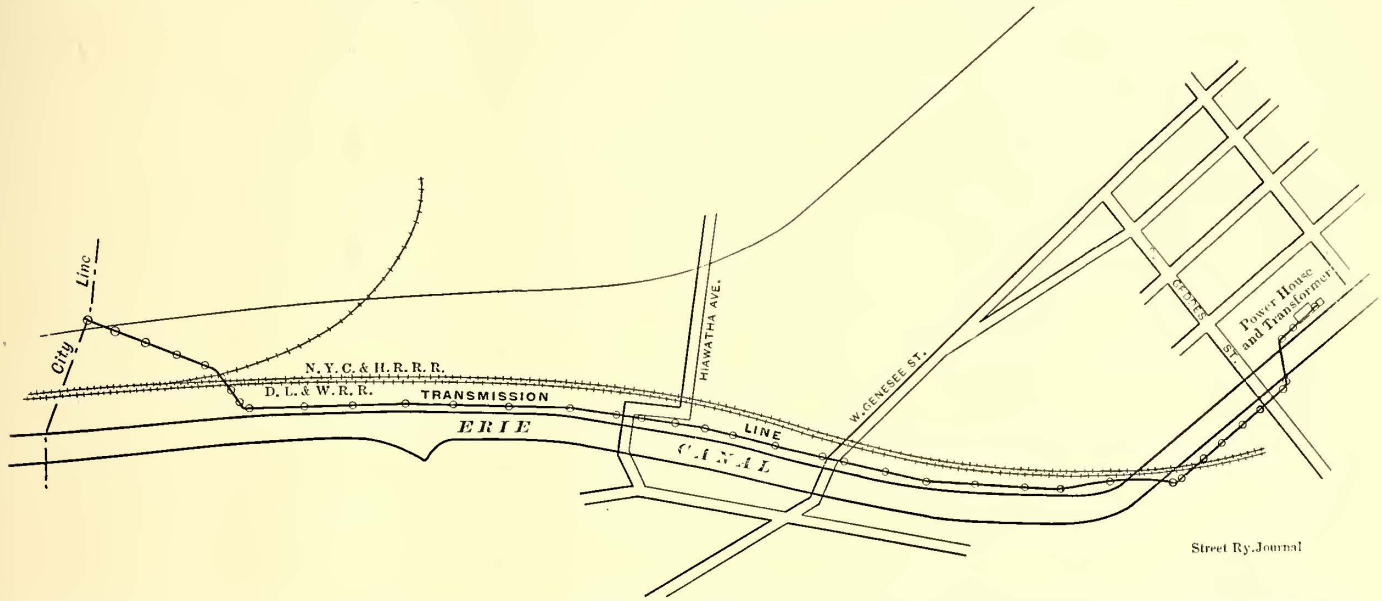
angles. The members of the upper section are laced and riveted together, and the horizontal members throughout are riveted to the upright members. The diagonal rod members are adjustable by right and left threads and clevices at the ends. The cross-arms are especially designed and braced to resist possible torsion should one or all of the cables break. All metal is ¼ in. thick or more.

Towers 57 ft. high and over are supported on concrete piers. Each leg of the tower is anchored by two 1-in. bolts running to the footings. The footing under each pier is 5 ft. x 3 ft. x 12 ins. thick, reinforced to resist uplift.

For the lighter towers under 57 ft. high, the concrete piers were omitted and the legs of the tower were spliced to angles which extend down into the footings. The footings are 8 ft. x 3 ft. x 12 ins., and are reinforced to resist uplift as well as down thrust. Each of these angles was enclosed below the ground line in a piece of stovepipe which was filled with cement grouting to prevent corrosion.

The towers were riveted in complete form so far as practicable at the shop, the actual field connections being bolted at the point of location before erection. The towers were raised and set, completely assembled, by the use of a tower wagon. The erecting wagon had a boom 40 ft. long, which was first raised by means of block and fall and a team of horses. The boom was then guyed three ways and used as a gin pole for erecting the tower. On similar work the contractor with this apparatus, one team, and a gang of eight men has raised as many as twenty towers in one day.

The towers were given one shop coat of red lead and oil and one coat in the field of graphite paint.



MAP SHOWING ROUTE OF HIGH-TENSION TRANSMISSION LINE IN THE CITY OF SYRACUSE OWNED BY SYRACUSE RAPID TRANSIT COMPANY

BIG DAY ON THE FOURTH FOR OHIO INTERURBANS

The action of the steam roads of Ohio in refusing to grant the usual cheap rates for July 4 turned a great mass of business to the interurban roads and furnished another example of how the two-cents-a-mile law is likely to prove a good thing for the electrics rather than a detriment. Reports from all parts of Ohio indicate that the traffic was the heaviest ever experienced, and in many cases it was simply a question of how many cars could be operated and how many the cars would accommodate. A large number of the lines annulled their freight and express runs and fitted up the express cars for passenger service by placing benches in them. The Columbus roads gave half-hourly service throughout the day and double-headed many of the runs. The Scioto Valley, Stark Electric and Lake Shore Electric made many of their runs in two and three-car trains. The lines in the Dayton-Toledo limited service double-headed their limiteds and ran half-hour local cars. The increased earnings over the same date last year experienced by two prominent Cleveland roads was probably equalled by a number of roads in various parts of the State. The Lake Shore Electric Company took in $7,600, as compared with $5,800 the previous biggest day, while the Cleveland & Southwestern Traction Company took in $4,800, as compared with $3,800 for the previous Fourth. In spite of record-breaking crowds, the cars were uniformly on time and no accidents were reported on any of the numerous lines in the State.

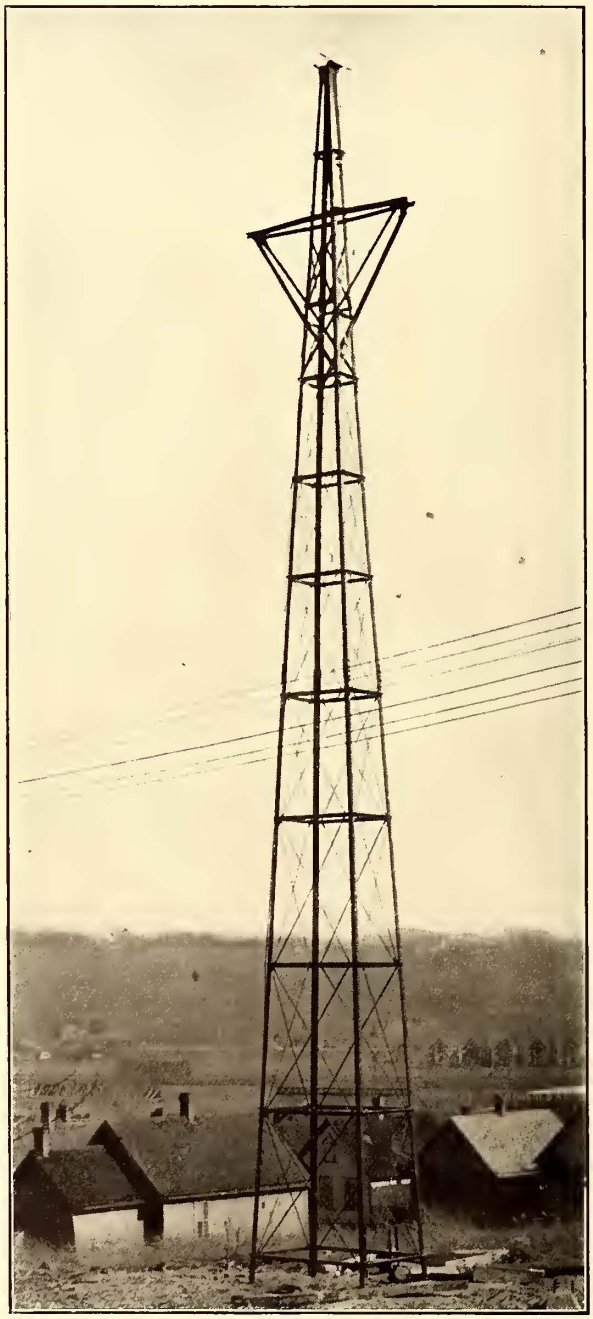
ANNUAL SESSION OF SOCIETY OF RAILWAY CLUB SECRETARIES

The Society of Railway Club Secretaries met in annual session at the Marlborough-Blenheim Hotel, Atlantic City, N. J., on June 15. After some discussion it was agreed that the society recommend to the various clubs that the proceedings of its annual meeting be published, with the official proceedings of the first fall meeting of each club, for the information of club members. It was also decided to send copies of the proceedings to the leading technical papers. A motion prevailed that the next meeting be held at New York on the second Saturday in December, this being done to avoid conflict with other conventions. An interesting paper was read by Mr. Powell on methods of securing advertising for society publications. The following officers were elected for the ensuing year: Chairman, J. D. Conway, Railway Club, of Pittsburg; vice-chairman, James Powell, Canadian Railway Club, of Montreal, and secretary, Harry D. Vought, New York Railroad and Central Railway Clubs, of New York.

An interesting relic of the San Francisco fire, and one that may represent a considerable loss to the United Railroads, consists of various masses of melted coin that the company recovered from its safes in the Rialto Building. At the time of the fire the United Railroads had many thousands of dollars in silver dollars, halves, quarters, dimes and nickels in the safes of Treasurer Starr, on the eighth floor of the Rialto Building. All the gold coin in the treasurer's office, contained in a separate safe, escaped unharmed, but the silver is unrecognizable. It consists of a small truckload of blackened masses of metal of irregular shape. Various metals are fused in the melted masses of coin, so that the company will probably be put to the expense of having them melted and refined. Treasurer Starr says that silver, nickel, copper and iron in unknown quantities are present in the big chunks of metal, the copper coming from melted one-cent pieces and the iron from the boxes in which the rolls of coin were packed.

TWO FORMS OF TRANSMISSION TOWERS IN NEW YORK STATE

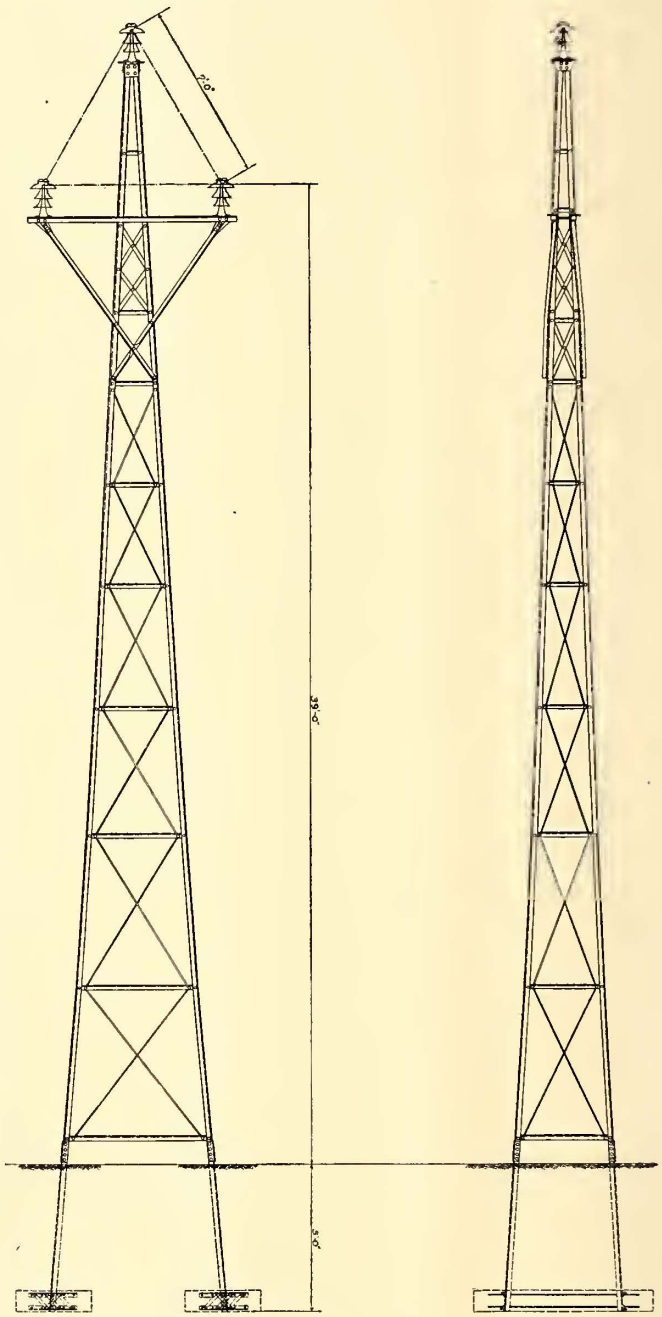
In the STREET RAILWAY JOURNAL for Nov. 18, 1895, an illustration was published of the steel tower adopted by the New York Central & Hudson River Railroad for carrying transmission wires, signal wires, telephone and telegraph lines, etc., within its electrical zone in and near New York City. Since this article was published, additional data as to dimensions and details have been received, which are given herewith. The illustration of the tower, published in the issue mentioned, is reproduced on the next page for convenience in reference.



TRANSMISSION TOWER OF ONEIDA RAILWAY ON WEST SHORE ELECTRIFICATION

The component parts of the tower consist of the following: Four L's 3 ins. x 3 ins. x 5-16 in.; lacing, one L 2¼ ins. x 1½ ins. x 3-16 ins. (single); connecting L's 2½ ins. x 2½ ins. x ¼ ins.; cap plate of malleable iron; rivets ¾ in. in diameter. The estimated quantities of material for one pole are: Steel, 1340 lbs.; concrete, 6.5 cu yds.; timber, 71 f.b.m.

The general conditions in installing the line are as follows: Distance from the center to center of poles on tangents is 150 ft., sag 30 ins.; distance on 1 deg. curve is 141 ft., sag 27 ins.; on 2 deg. curve 133 ft., sag 24 ins.; on 3 deg. curve 125 ft., sag 21 ins.; on 4 deg. curve, 118 ft., sag 18½ ins.; on 5 deg. curve 112 ft., sag 16½ ins.; on 6 deg. curve 107 ft., sag 15 ins. The sag of wires for all spans is computed at 70 degs. F. with no wind. Load on poles: Six-wire circuit No. 1, each 0.728 ins. diameter, area 400,000 cm., weight 1.22 lbs.



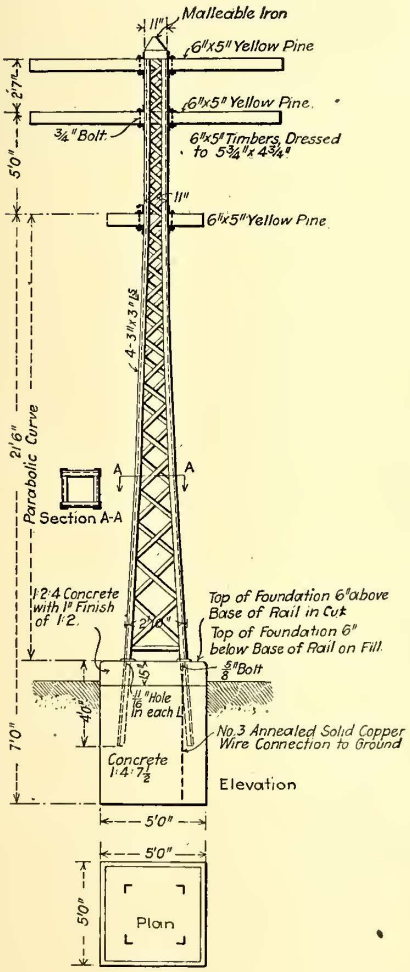
VIEWS SHOWING THE FRAMING OF THE ONEIDA RAILWAY TRANSMISSION TOWERS

per linear foot; four-wire circuit No. 2, 1-5 in. diameter, area 1,000,000 cm., weight 3.55 lbs. per linear foot; three wires, circuit No. 3, each 0.165 in. diameter, area 27,225 cm, weight .074 lb. per linear foot, together with ½ in. coating of ice on all wires. The wind pressure is 30 lbs. per square foot on the surface of the pole, and on all wires covered with ½-in. coating of ice. Unit stresses: Tension 30,000 lbs. per square inch net section; the compression is $\frac{30{,}000 \text{ lbs.}}{1 = \frac{L^2}{125r^2}}$ per square inch cross section; shear on rivets 22,500 per

square inch; bearing on rivets 45,000 lbs. per square inch; maximum bending moment on pole 2,910,000 inch-lbs.; maximum overturning moment of pole 3,340,000 inch-lbs. The painting is to be one coat of New York Central standard red-lead paint on each surface in contact before assembling, and one coat on the entire pole before leaving the shop. Before erection two heavy coats of New York Central asphaltum varnish are to be added.

In this connection are published a half-tone and line engraving showing the transmission tower adopted by the Oneida Railway for its West Shore electrification work, plans for which were published in the STREET RAILWAY JOURNAL for May 19. These towers were designed by the Archbold-Brady Company, of Syracuse, N. Y.

The towers are to be, in general, as shown in the line drawing on page 76, and are rectangular in section. The horizontal members of the towers are riveted to the uprights and the diagonal members are adjustable rods with right and left-hand threads which screw into malleable-iron clevises at the ends. The standard tower on the West Shore line will be 39 ft. in height from the ground to the top of the bottom insulator, and these towers will be shipped out of the shop complete with the exception of the section which goes into the ground and the cross-arm. The drawing shows the general arrangement of the foundation, which is of reinforced concrete, especially designed to resist uplift, and for which the Archbold-Brady Company has patents pending. The cross-arm consists of two angles bent together and braced with angle braces on each side to resist torsion in case of broken wires.



STANDARD STEEL TOWER OF THE NEW YORK CENTRAL RAILROAD

Although the standard tower is 39 ft. in height, special towers will be required up to 69 ft. in height from the ground to the top of the bottom insulator, or approximately 75 ft. to the top. Where the legs of the tower extend below the surface they will be protected by a 6-in. concrete sleeve reaching 3 ins. above surface of ground. The towers, 57 ft. high or over, will have concrete pier foundations reinforced to resist uplift.

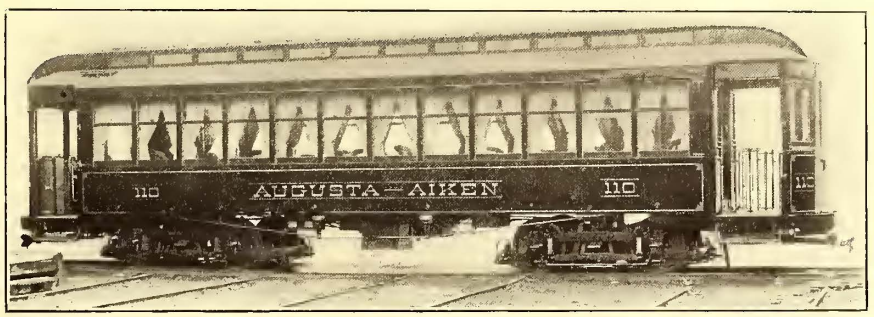
The pins will be of malleable iron and about 18 ins. high above the cross arm. They will be circular in cross section and attached to the cross arm with 4⅝-in. bolts. The surface of the pins will be smooth and so curved that there will be no sharp angle from which arcs might occur. The insulators will be furnished by R. Thomas' Sons Company, and will be that company's style No. 4002. The pins will be shipped to the Thomas factory and will be cemented into the insulators. The towers will be set in general about 480-ft. centers. On curves, towers will be closer together, compensating the strain due to the angle against the less wind pressure due to the shorter spans.

The cable will be of single No. 0 stranded copper and will be strung to a sag of 12 ft. at 32 deg. F. Where the spans are shorter, the sag will be decreased so as to have uniform strain in the cable. Where heavy strains occur, necessitating a double cross arm, the cable, instead of resting on the insulators, will be attached to an equalizing saddle to distribute the load equally on the two insulators. These saddles are so designed that in case one insulator should be defective it may be removed and another substituted without removing the cable from the saddle.

In preparing the designs and in making the calculations for this work, special attention was given to having a construction which would be of practically the same strength in all portions and in which there would be a minimum of field labor.

HANDSOME DRAWING ROOM CAR FOR AUGUSTA-AIKEN RAILWAY

In the STREET RAILWAY JOURNAL of Nov. 19, 1904, was published an article describing the equipment of the Augusta-Aiken Railway & Electric Company, which consists of Brill semi-convertible cars mounted on high-speed trucks. These cars measured 33 ft. 4 ins. over the body and 42 ft. 9 ins. over the vestibules. The railway company has lately received two more cars of the same type, with the exception that the improved grooveless-post window system is included. One of these cars is slightly longer than the standard size of the rolling stock, and is furnished with easy chairs and draperies at the windows, and is intended for drawing-room service. The silk window draperies, plush chair cushions and handsome floor rugs are in harmonious shades of blue, and the ceilings are tinted in robin's-egg blue; mahogany, richly carved and inlaid, constitutes the interior finish, and altogether the appearance is most attractive. Transverse seats were also furnished for the car, so that when not required for drawing-room service it can be readily fitted for regular passenger service. The transverse seats were manufactured by the car builder, and are of the push-over-back type, upholstered in spring cane and furnished with nickel-plated grab handles. It is intended to run the car between Augusta and



DRAWING ROOM CAR ON THE AUGUSTA-AIKEN RAILWAY

Aiken without stops, on fast time, the distance being about 25 miles. The grades are easy and the curves of large radii, permitting a high speed to be maintained for all of the distance.

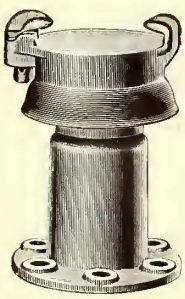
The length of this car over the end panels is 35 ft., and over the vestibules 44 ft. 5 ins.; width over the sills, including

THE HANDSOMELY FURNISHED INTERIOR OF THE AUGUSTA-AIKEN CAR

the side sheathing, 8 ft. 6 ins.; distance between the centers of the side posts, 2 ft. 9 ins.; from the track over the trolley boards, 12 ft. 6 ins.; size of the side sills, 4 ft. 7¾ ins.; and the end sills, 5¾ ins. x 6⅞ ins. The inside sill plates are 12 ins. x ⅜ in. Under trusses and double-trussed needle beams are used. The trucks are of the 27-E1 type, having a wheel base of 6 ins.; the wheel diameter is 33 ins. and diameter of axle 5 ins. The trucks are equipped with motors of 50-hp capacity each.

THIRD-RAIL SUPPORTS FOR THE METROPOLITAN ELEVATED, CHICAGO

The Albert & J. M. Anderson Manufacturing Company has recently booked a number of large orders for third-rail supports, the latest being for 2500 of a type similar to that shown in the accompanying cut, for the Metropolitan West Side Elevated Railway Company, of Chicago. Ever since the abandonment of the wooden blocks first used on the Chicago elevated lines, these third-rail insulators have been installed in very large quantities, and their continued use is suggestive of the satisfactory results obtained. These supports have also been used in Boston since the first installation of the third-rail system on the Boston elevated lines, and the company is now filling an order for a new type of the third-rail insulator to be used in Boston, and in which the insulation will be Ætna.

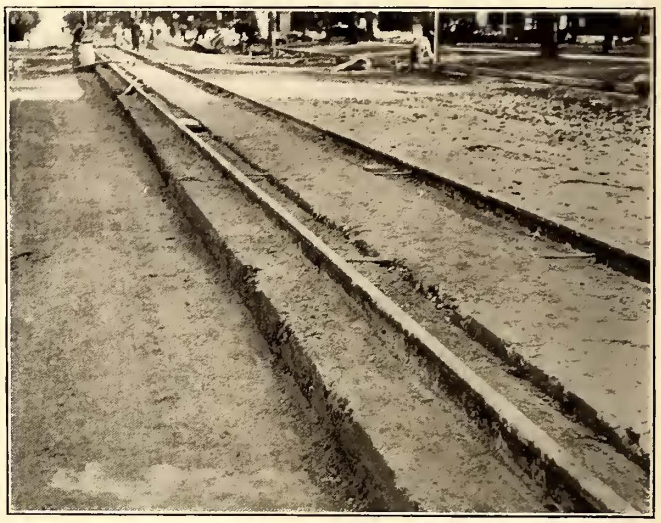


THIRD-RAIL SUPPORT

All passes have been abolished by the Metropolitan Street Railway Company, of Kansas City, Mo., and hereafter policemen, firemen, members of the Council, and motormen and conductors in uniform will be the only ones to ride free.

IMPROVEMENTS IN MADISON, WIS.

Since the Madison & Interurban Traction Company, of Madison, Wis., purchased all the property rights and franchises of the Madison Traction Company, recently, the road has developed remarkably. The accompanying views show the substantial manner in which the rebuilding of the tracks



CONCRETE ROADBED LAID BY THE MADISON AND INTERURBAN TRACTION COMPANY

has been carried out, one showing the method of laying the girders in concrete and the other the Belgian paving blocks being placed in position. The new rails are of 72-lb., 6-in. section in 60-ft. lengths, and the joints are cast welded. The company has completed plans for the erection of a new power house to serve urban and interurban traffic. A new car house has recently been erected, containing a machine shop, a blacksmith shop, and a paint shop, in addition to space for forty-two cars.

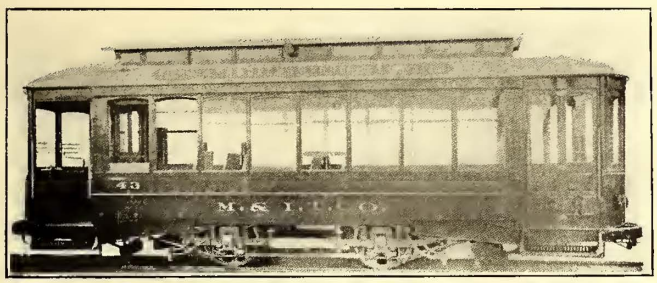
The city of Madison is situated between two lakes, and

TRACK CONSTRUCTION IN RESIDENTIAL STREET AND OPPOSITE THE STATE UNIVERSITY

several other lakes are in the immediate vicinity to the south. The street railway company proposes to extend its system so as to connect all of these lakes and to include also South Madison, at which time considerable excursion travel is expected. Other plans on foot are to connect Madison with Lake Michigan by trolley, touching Fond du Lac and Plymouth, thence to Sheboygan, an interurban line being already

in operation between the two last named cities. The company's regular schedule provides for the operation of about fifteen cars with extras during the hours of heavy travel and on special days. Seven thousand people, approximately, are carried each day, and from that number to 25,000 on special days. A ten-minute instead of a twelve-minute schedule is now being maintained, which the company is convinced will mean greater patronage and economy of operation.

The plan has been adopted of standardizing the equipment, and the Madison & Interurban Traction Company states that Brill cars and trucks have proved so acceptable and economical in operation that it has decided to make them its standard. The new addition to the company's equipment consists of ten cars of the grooveless post semi-convertible



SINGLE-TRUCK CAR FOR THE MADISON AND INTERURBAN TRACTION COMPANY

type, a car excellently suited to the local requirements. The American Car Company, of St. Louis, is the builder. The chief dimensions of the car are: Length over the end panels, 20 ft. 8 ins.; length over the crown pieces, 30 ft. 8 ins.; width over the sills, 7 ft. 9½ ins.; width over the posts at the belt, 8 ft. 2 ins.; sweep of the posts, 2¾ ins.; distance between the centers of the posts, 2 ft. 5 ins.; height from the floor to the ceiling, 8 ft. 4⅜ ins.; height from the track to the under side of the sills, 2 ft. 6⅜ ins.; width of the aisle, 24 ins. The cars are finished in cherry; ceilings of birch, painted and decorated. The 21-E single trucks have a wheel base of 8 ins., a wheel diameter of 33 ins., and carry 25-hp motors.

A NEW ELECTRIC MOTOR TRUCK

BY W. G. PRICE

The Standard Motor Truck Company, of Pittsburg, has been incorporated and has purchased a large plant at New Castle, Pa., which is being equipped with all new machinery especially for the manufacture of motor trucks. This plant will be ready for the manufacture of trucks about Aug. 1, 1906. The types of trucks to be manufactured are those which have been developed during the past three years at the works of the Standard Steel Car Company, at Butler, Pa., and include long and short wheel base double trucks and single trucks. The task undertaken by the company, and which has been successfully accomplished, has been the development of trucks which should possess the following features:

The frames to be of low carbon open-hearth steel, without welds.

All parts of frames to be secured by rivets instead of bolts, wherever possible.

All double trucks to have the journal boxes rigidly connected by equalizer bars.

No wear of the journal boxes and frames where these parts engage each other.

The brakes on double trucks to be carried on the equalizer bars.

All brake shoes and brake heads to be of the M. C. B. standard form.

The brake hangers to be kept tight automatically, so as not to require adjustment and not to wear out.

The brakes on long wheel base double trucks to have no brake beam, and the shoes to stay in line with the wheels and wear true.

All release springs to be carried so as to act at the top end of the live levers and not to be connected to brake beams.

The brakes to be adjusted automatically, so as to require no attention till the shoes are worn out.

The automatic brake adjuster to be simple in construction, enclosed so as to be protected from mud and water, and to be durable and easy to operate when worn shoes are replaced.

The journal box lid to be so designed that the forked check plate type of axle journal can be used, and the lid to be easily and quickly opened and closed, and when closed to be tight and secure from rattling.

The journal box of the large trucks to be designed to use the M. C. B. type of journal, journal bearing and wedge, but also to be prepared to receive the same journal bearing and wedge with the forked check plate to hold the axle against end movement.

The double trucks to be provided with swing bolsters, and the swing of the bolsters to be checked by means of friction, so as to prevent a cumulative side swing of the car.

The bolsters and transoms to be provided with removable wear plates, so that neither the bolsters nor the transoms can wear out.

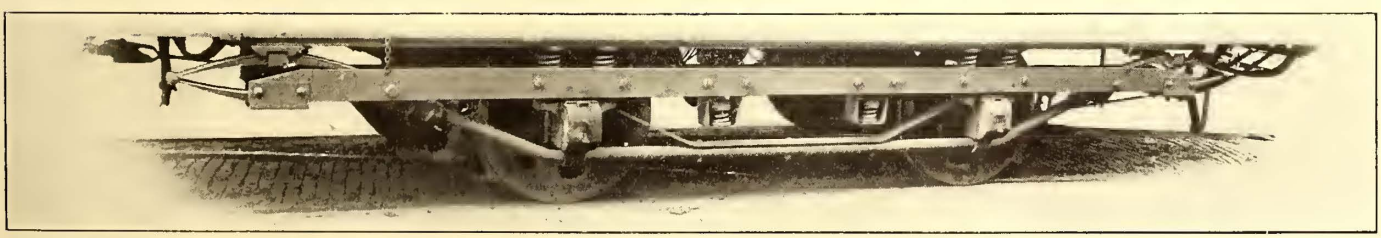
In the large double truck the motor to be suspended on the equalizer bars, or directly upon the transoms, as may be desired.

The single truck to have the journal boxes rigidly connected by a truss, which should support the top chord, so as to hold up the ends of long cars.

The single truck to run at all speeds over rough track, without galloping.

The value of the accomplishment of the above results must be obvious to all who are familiar with the equipment used in electric traction.

Rolled open hearth steel is undoubtedly the best material



ELECTRIC RAILWAY TRUCK, TYPE C-35

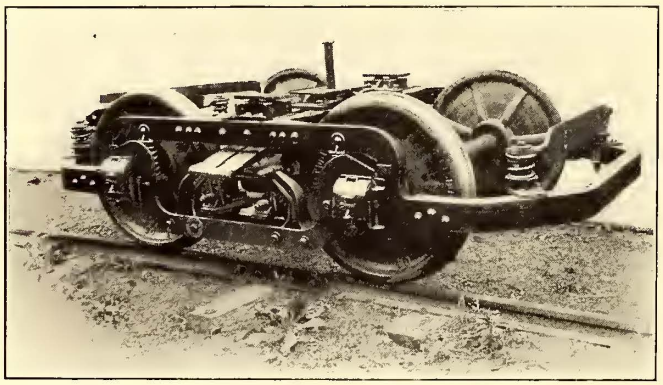
that can be used, but it cannot be safely used where it has to be welded; welds are always liable to be imperfect, and when rolled steel has been given a welding heat its condition

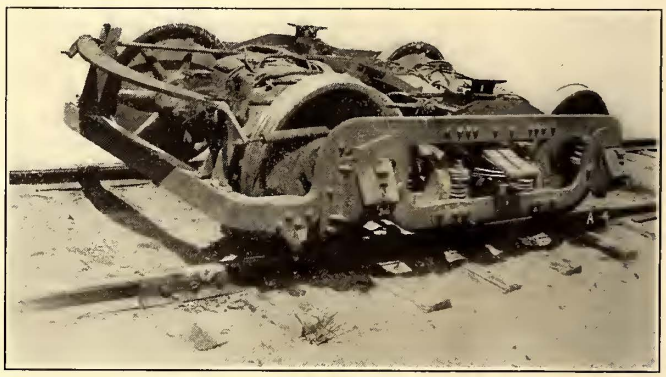
changes to that of cast steel, and it does not receive sufficient working after welding to bring it back to the tough structure of rolled steel.

Rivets are used instead of bolts, because where rivets in sufficient numbers, driven with 45-ton pressure, are used, they do not come loose under the severest conditions of electric traction.

By rigidly connecting the journal boxes and making a close fit between the journal bearings and the insides of the boxes, there is no danger of the wheelings moving towards or away from each other, so as to cause the brake shoes to rub against the wheels—a condition which frequently exists with trucks not so connected, which have been in use long enough for the journal boxes and pedestals to become worn, and even in many new trucks in which the journal boxes are not a tight fit between the pedestals.

In this system of trucks the spring deflection necessary for easy riding takes place mostly in the elliptic bolster springs, which are long and never have more than four leaves in contact with each other, while the coil equalizer bar springs are made comparatively short, and are located between the equalizer bars and against the journal boxes. The equalizer bar springs are short and are so located that they are not deflected in a horizontal direction by the brake and motor





ELECTRIC MOTOR TRUCKS, TYPES O-50 AND C-60

action sufficiently for the journal box jaws to come in contact with the pedestal part of the frame, so as to wear away those parts.

It was found that the damping effect of an elliptic spring having three or four leaves in contact gave the easiest riding effect, and when a larger number of leaves in contact with each other was used the riding was not as good. For this reason, when more than four leaves are required to carry the load the springs are made with sets of three or four leaves under the same bands, but independent of each other.

By carrying the brakes on the equalizer bars the vibration caused by the brake application was eliminated from the truck frame and the car body, and the shoes were always the same height on the wheels, so that the brakes were as efficient with a full load as with no load.

By locating the brake shoes at the M. C. B. standard height, and by placing stiff compression coil springs on the bolts which secured the hangers to the brackets and brake head, the rattle and chatter was greatly reduced. Moreover, wear on the brake hangers is practically eliminated, and that on the brake bracket and brake head and bolts brought to a minimum, while no adjustment or attention to these parts is required.

By avoiding the use of brake beams in the large trucks with inside hung motors, the number of parts is also much reduced, and there is more space in which to work at the motors. It was found that by a proper location of the brake head the shoes would stay in line with the wheels and wear true without the use of a brake beam.

Where release springs are attached to the brake beams they nearly always cause two of the shoes on each truck to press against the wheels, and so retard the movement of the car. This is caused by the variation in adjustment of the springs which pull against each other, and the use of shoes but little worn with others on the same truck more nearly worn out. To avoid this effect, all release springs are so attached as to act only at the tops of the live levers.

All of these trucks can be provided with automatic turnbuckles, which will hold the shoes about 3-32 in. from the wheels till the shoes are worn out. This turnbuckle is so constructed that when the brakes are applied, and also when they are released, it automatically lengthens itself, but it will not change its length when the shoes are nearer than 3-32 in. from the wheels. The distance at which the shoes are to be carried from the wheels can be made more than 3-32 in. if desired. The turnbuckle has a screw in a threaded pipe. The screw pushes out a piston which carries one jaw while the pipe carries the other jaw. The screw is turned by the longitudinal movement of the piston when the brake is applied and released. Ratchet teeth, which are cut on the ends of the screw and piston and which fit into each other, do the work of adjustment. The screw cannot turn backward, as the teeth are always in engagement, so that the device is safer than the ordinary turnbuckle. When new shoes are to be put on, the screw is run back by revolving the piston. This device has been working under the severest conditions of mud, water and ice, without failure or indications of wearing out.

The journal box lid is held in place by a stiff spring which pulls it on from the point at the center of the lid where the spring is fastened. When the lid is open it hangs on the spring, which then acts as a hinge. When the lid is closed it can be quickly fastened by a thumb nut, so it cannot rattle or come loose.

The journal boxes for the large trucks are so constructed that either the standard M. C. B. form of journal or the forked check plate form can be used. Both forms use the M. C. B. journal bearing and wedge. The forked check plate form is preferred, as it prevents the longitudinal movement of the axle, which with the M. C. B. journal soon becomes as much as ½ in., causes the wheel flanges to wear out the groove in the brake shoes, and greatly adds to the side swaying of the car. The retarding of the side swing of the car on the bolster hangers by means of friction so as to absorb the energy of motion and prevent a cumulative swing of the car, makes the riding much easier and reduces trolley jumping.

The last previous improvement in the riding of cars was

made many years ago when the spring buffers were placed at the ends of cars so that by their friction against each other the swaying of cars in a train would be greatly reduced. The use of a similar friction device in the swing bolster constitutes another great improvement which will be greatly appreciated by the traveling public.

The suspension of the motors directly upon the equalizer bars prevents the vibration due to the operation of the motors from reaching the car bodies, and as the motor bars rest on top of the equalizer bars there is no chance for the motors to drop to the ground. In this truck the nose of the motor can be carried directly upon the transoms, if desired.

In the single truck the journal boxes form the vertical tension member of the truss, which supports the top chord. The journal boxes are thus rigidly connected as in the other trucks. The outside diagonal truss pipes carry stiff coil springs on their ends which support the extended ends of the top chord or frame, and enable the elliptic springs to carry the ends of the car so they will not bend down.

The single truck has been tested at all usual running speeds on very rough track, and does not gallop. It can be run at high speed on such track when other trucks which are carried on journal box springs alone can be run only at slow speeds. As there are no pedestal jaws, there is nothing on this truck to wear out.

ELECTRICAL ROLLING STOCK FOR THE ERIE

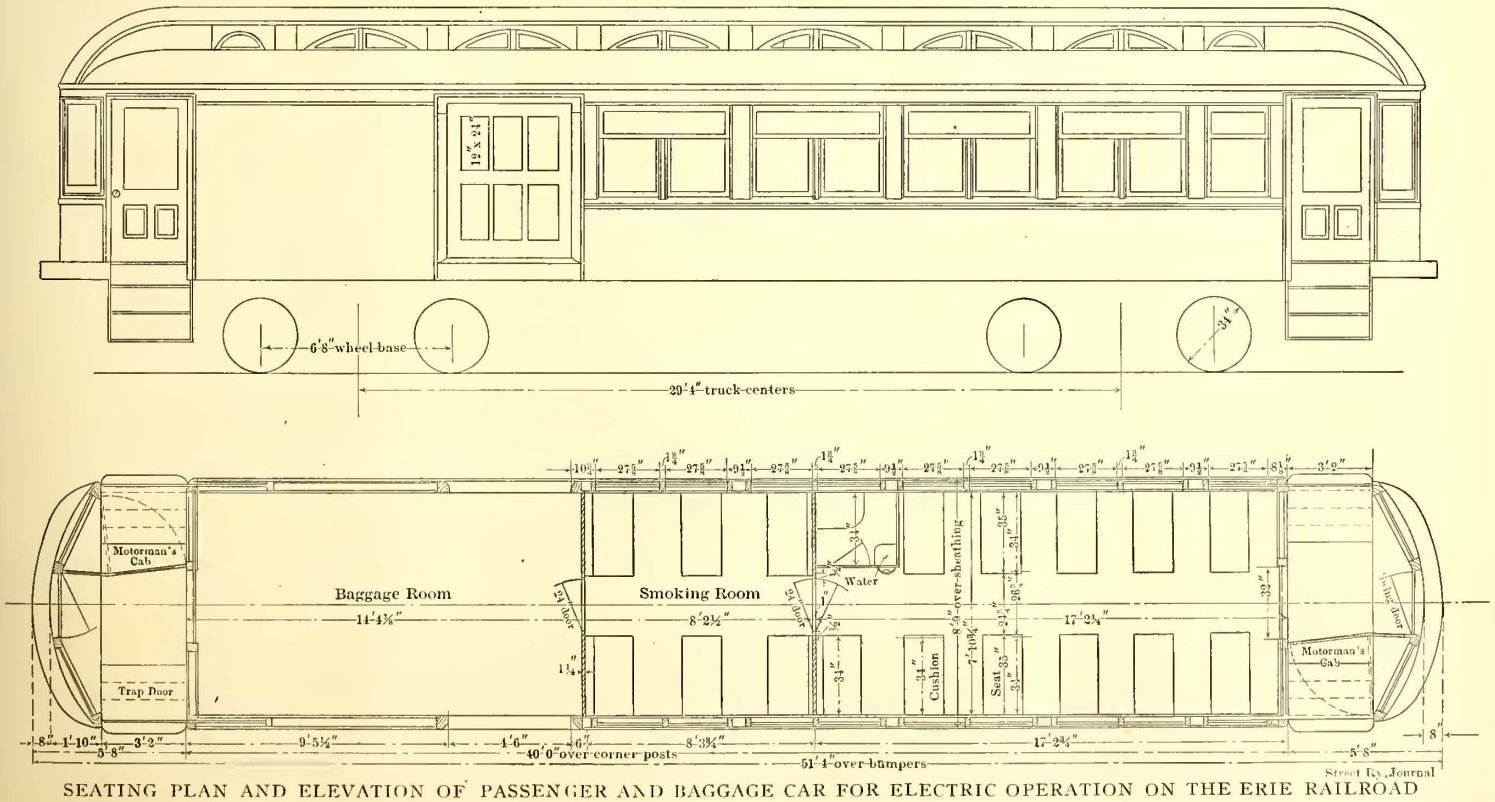
As announced in the STREET RAILWAY JOURNAL of July 7, the Erie Railroad Company has ordered from the St. Louis Car Company one combination passenger and baggage car and four combination passenger and smoking cars, for the division between Rochester and Mt. Morris, which the railroad company is fitting up for electric operation. The smoking compartment will be furnished with rattan seats and the passenger compartment with plush. All of the cars will be mounted on the car builder's No. 61 trucks, with 34-in. diameter wheels, 6-ft. 8-in. wheel base; composite frame of steel and wrought iron, and 4¼-in. x 8-in. journals.

As noted in last week's issue, the regular passenger cars will have the following principal dimensions: Length of the car body, 40 ft.; length over the vestibules, 49 ft. 10 ins.; length over all, 51 ft. 4 ins.; and height of the car from the top of the rail to the top of the roof, 13 ft. 4 ins..

The bottom construction of these cars consists of side sills of 5-in. x 8-in. yellow pine with 6-in. channel and fillers. The intermediate sills are of 4½-in. x 6 in. yellow pine. The center sills are composed of 6-in. I-beams with fillers. The intermediate and center sills extend the full length from bumper to bumper. The platform is of the standard steel type. All the cars have upper and lower truss rods and needle beams of 5-in. I-beams. The bolsters consist of 10-in. plates. The end sills are 8-in. x 6-in. oak. The flooring is double.

There will be six double and one single window on each side of the car. All the lower side windows will be equipped with sash balancers. All sash are upper and lower and are of plate glass, the lower being arranged to raise, while the upper is stationary. The upper glass has a neat fine line of gold. The ventilators are of ornamental glass, half elliptic, and open on ratchets. The interior of the car will be finished in mahogany with marquetry inlay lines, of plain and neat design. The end doors are of the double sliding type. The ceiling is semi-empire. The seats are of the car company's reversible type, twelve on each side and four corner seats. There will also be continuous basket racks on each side.

The vestibules have a single sliding door on each side, with trap doors over the steps. The steps are of sheet-iron slides with wood treads. Each vestibule is provided with a double-acting swinging door so arranged as to form a motorman's cab which can be folded so as to enclose the controller, brakes, etc., and clear the vestibule for passengers and steps. A switch box is also placed on this side of the vestibule. The vestibule ends have single drop sash on each side and door with drop sash in center. The cars will be further equipped with St. Louis Car Company's arc headlight, sand boxes and vertical wheel brakes. There will also be a pilot on each end of the car, and Buhoup three-stem couplers.



SEATING PLAN AND ELEVATION OF PASSENGER AND BAGGAGE CAR FOR ELECTRIC OPERATION ON THE ERIE RAILROAD

FINANCIAL INTELLIGENCE

Wall Street, July 11, 1906.

The Money Market

Notwithstanding the unusually heavy decrease in cash reported by the clearing house banks on last Saturday, the money market displayed a decidedly easier tendency during the past week. The demand for money was more active, and bankers and individual lenders were disposed to offer with more freedom than has been the case heretofore. Money on call has been in plentiful supply at rates ranging from 4½ per cent to 2 per cent, and averaging about 3¼ per cent. In the time loan department rates have remained unchanged, at from 4½ to 5 per cent for two to four months, but for the over-the-year maturities the asking rate has declined ¼ to 5½ per cent. In some instances six months' money was obtainable at 5¼ per cent, the standing of the borrower and the character of the collateral offered being taken into consideration. At the present time there is nothing in the situation calculated to cause any disturbance in the money market in the near future. This week the depository banks will be called upon to repay into the Federal Treasury $10,000,000 special deposits, of which about one-fifth will come from the New York institutions. Later in the month provisions will have to be made for the taking up of the $30,000,000 2 per cent Panama Canal bonds. This transaction, however, will be of benefit to the banks, as it will not only enable them to take out new circulation for practically the full amount, but it is also possible that the Secretary of the Treasury will deposit in the banks the moneys derived from the sale of these bonds until wanted by the Government. New gold continues to arrive from the Klondike, and the additional arrivals of the yellow metal from that source are expected to considerably reinforce the reserves of the local institutions. During the week $1,500,000 gold was repaid to the Government on account of previous advances on gold imports from Europe, and a like amount of new gold was engaged in Australia for shipment to this center. The latter consignment, however, will not arrive until early next month. Rates for foreign exchange have ruled around the point at which gold may be brought from Europe, but up to this time local bankers have refrained from bidding for the gold arriving in the London open market from South Africa, so as not to disturb the money situation abroad. Foreign fire insurance companies have paid some of the losses incurred by the fire at San Francisco, but the amount of bills drawn against these payments has not been large enough to depress the sterling market to a level that would permit our bankers to draw gold direct from the Bank of England. The European money markets have been quiet but rather firm. The bank statement published last Saturday was decidedly unfavorable, inasmuch as it showed a loss in cash of $8,909,000. This heavy loss was due in part to the paying off of the $9,000,000 Baltimore & Ohio Railroad loan, and partly to the workings of the new law calling for an increase in the reserves of the trust companies. Loans decreased $6,366,800, as a result of the transfer of loans to foreign bankers. Deposits were $13,273,300 smaller than in the preceding week, and the reserve required was reduced on that account by $3,318,325. The surplus reserve decreased $5,590,675, bringing the total surplus down to $6,465,075. This compares with a surplus in the corresponding week last year of $7 957,825, $36,017,725 in 1904 $8,008,475 in 1903, $12,226,900 in 1902, $12,809,375 in 1901, and $15,589,200 in 1900.

The Stock Market

The stock market during the past week has been quiet, and to a certain extent an anonymous one. While at times there was selling pressure, there was a certain amount of buying power sufficient to absorb all offerings, but later the liquidation was on a large scale, and the buying power was correspondingly reduced. Apart from the heavy losses in cash sustained by the New York banks, as revealed by last Saturday's bank statement, and which resulted in a large reduction in the surplus reserve, the developments of the week were of a favorable character. Railroad earnings continued to show large increases over those for the corresponding periods of previous years, and according to all accounts the iron and steel industry was never in better condition than at present. Money continued to work easier; sterling exchange has declined, and there is reason to expect that local banks will be able to secure substantial amounts of gold in Europe for import to this side. The Government's monthly crop report was fully up to expectations, but it was received with indifference. The condition of winter wheat on July 1, 1906, was 85.6 per cent as against 83 per cent on June 1, 1906, 82.7 per cent on July 1, 1905, 78.7 per cent on July 1, 1904, and a ten years' average of 79.4 per cent. The condition of spring wheat on July 1 was 91.4 per cent, as against 93 per cent on June 1, 1906, 91 per cent on July 1, 1905, and a ten years' average of 88.2 per cent. The condition of corn was 87.5 per cent, as against 87.3 per cent on July 1, 1905, and a ten years' average of 86.4 per cent. The indicated yield of spring and winter wheat is 722,755,000 bushels, as against an indicated yield on June 1, 1906, of 713,339,000 bushels, while the indicated yield of corn is 2,703,641,000 bushels, as against 2,651,000,000 bushels on July 1, 1905. Rumors that several of the larger railroad companies had been successful in placing loans abroad were emphatically denied. The Great Northern ore deal story was also revived, and this was responsible in a measure for the erratic movements in the Hill stocks. At the close the market had the appearance of being oversold, and in some quarters a recovery in prices is expected. The course of the market, however, depends upon the crops and the money market. Of the former pretty much is known; the latter is very uncertain, but at the present time there is nothing in the situation calculated to cause any disturbance in conditions in the near future. One of the principal features was the sharp break in the traction shares. The decline in Interborough-Metropolitan issue was attributed to selling by members of the pool, which is understood to have been dissolved. Brooklyn Rapid Transit was heavy, on the agitation in favor of the 5-cent fare within the limits of the borough of Brooklyn.

Philadelphia

The dullness prevailing in the general securities markets during the past week has been reflected to a considerable extent in the local traction shares. Trading in these issues included a very small number of stocks, but prices as a rule held fairly firm throughout the week. Philadelphia Rapid Transit was the active feature, upwards of 2400 shares changing hands at from 26 to 25. Philadelphia Traction displayed more activity than of late, about 800 shares selling at 98¾ and 99. Union Traction was decidedly firm, the price scoring a small net gain to 63½, on purchases aggregating about 1200 shares. Other transactions included American Railways at 52¼, Consolidated Traction of New Jersey at 79½, Philadelphia Company common at 49½ and 49⅜; the preferred at 50¼, Railway General at 6¾, and United Companies of New Jersey at 258.

Chicago

Trading in the local market for street railway issues was extremely dull during the week, and prices fluctuated rather sharply. North Chicago opened at 32 and dropped to 30, but subsequently recovered all of the loss, about 350 shares were dealt in. West Chicago, after advancing a point to 26, later lost all the improvement. Union Traction sold at 4⅝, and South Side Elevated brought 95 for a small lot.

Other Traction Securities

The feature of the Baltimore market was the strength in United Railway incomes, which advanced a point on the announcement that the management of the company would soon make known its plan for refinancing the property. While nothing officially has been given out regarding the plan, it is said that the plan provides for the funding of the overdue coupons on the income bonds, which amounts to about $1,400,000, by an issue of certificates of indebtedness which will bear interest at 5 per cent. About $50,000 of the income bonds changed hands at from 72½ to 73½. The 4 per cent bonds were very quiet, about $20,000 selling at 92⅛ and 92¼. The free stock sold at 15, while 300 shares of the pooled stock brought 15⅞. Other transactions included Norfolk Railway & Light stock at 19, and $31,000 of the 5 per cent bonds

at 99¼. In the Boston market interest centered largely in Massachusetts Electric issues, both of which displayed decided strength. The common, after selling at 18½ rose to 19, while the preferred advanced from 68½ to 69¾, on purchases of less than 500 shares. Boston Elevated opened firm at 153, but subsequently dropped a point and closed at the lowest. Boston & Worcester common was steady at 27 and 27½, and sales of small lots of the preferred were made at 77 and 80. West End common sold at 96½ and 96¼, and of the preferred at 110.

At Cincinnati last week, Cincinnati, Newport & Covington had another upward movement, advancing from 72¾ to 73¼, a high mark for this stock, which has been arrived at by speculative trading, as the stock is not on a dividend paying basis. The preferred declined from 96½ to 96 on small sales. Cincinnati Street Railway sold at 142½, a fractional decline. Toledo Railways & Light sold at 33, and Cincinnati, Dayton & Toledo at 26½, both slight declines.

At Cleveland, after making a low figure of 74¾, Cleveland Electric showed signs of increasing strength, on indication that the company is about to put up a fight to regain the ground lost to the new low-fare company. Early this week the stock sold at 75½. Northern Ohio Traction & Light advanced to 30⅛, and Lake Shore Electric moved up fractionally to 16¾. On the curb there has been considerable trading in Toledo & Western at 6½, even with the price offered by the Nutt syndicate, which is trying to buy the property now in receiver's hands.

At Columbus, Columbus Railway advanced slightly from 84 to 86, on the announcement that the company had taken over the Central Market lines, the rival local system. It is figured that in the long run these lines will prove a valuable acquisition to the system, although at present their earning power is small. Scioto Valley preferred was in good demand at 93¼ to 94½.

Security Quotations

The following table shows the present bid quotations for the leading traction stocks and the active bonds as compared with last week:

	July 5	July 11
American Railways	52¼	52⅛
Boston Elevated	153	152
Brooklyn Rapid Transit	72½	73⅜
Chicago City	—	—
Chicago Union Traction (common)	4	4⅛
Chicago Union Traction (preferred)	12¾	12¼
Cleveland Electric	81	81
Consolidated Traction of New Jersey	—	77
Detroit United	92	92
Interborough-Metropolitan, W. I.	36½	35
Interborough-Metropolitan (preferred), W. I.	72¼	73¾
International Traction (common)	58½	a55
International Traction (preferred), 4s	82	79
Manhattan Railway	147⅞	148
Massachusetts Electric Cos. (common)	18	18
Massachusetts Elec. Cos. (preferred)	a69	a69½
Metropolitan Elevated, Chicago (common)	26	26
Metropolitan Elevated, Chicago (preferred)	67	67
Metropolitan Street	—	—
North American	92¼	92¾
North Jersey Street Railway	27	27
Philadelphia Company (common)	49¼	48⅝
Philadelphia Rapid Transit	24¼	30
Philadelphia Traction	99	99
Public Service Corporation certificates	68	67
Public Service Corporation 5 per cent notes	95½	95¼
South Side Elevated (Chicago)	95	96
Third Avenue	125	124
Twin City, Minneapolis (common)	111	113
Union Traction (Philadelphia)	63	63
West End (common)	—	—
West End (preferred)	—	—

a Asked.

Metals

According to the "Iron Age," steel-making iron continues scarce, the scarcity being more prominent in Bessemer pig in the Central West. The market for foundry iron is more encouraging and shows a firmer feeling. While some large steel rail business for next year is pending, actual sales during the past week have not been large. The structural shops are getting in a good deal of work. The Western agricultural implement manufacturers have resumed work at their plants for the 1907 season. So early a start is unprecedented. The situation in steel bars is thoroughly sound.

Copper metal holds firm. Quotations are 18½c. to 18⅝c. for lake, 18⅛c. to 18⅜c. for electrolytic, and 18c. to 18⅛c. for castings.

SCHOEPF HOLDING CORPORATION TAKES OVER PROPERTIES

The Indiana, Columbus & Eastern Traction Company, the recently incorporated holding and operating corporation formed to take over the Schoepf interurban properties, assumed actual charge of the various properties on July 1. This system now embraces the largest interurban system in the country operated under one management. The roads acquired include 446 miles of operating traction lines, in addition to a large mileage under construction. These roads extend in an unbroken line from Zanesville, Ohio, to Richmond, at the Indiana State line, and from Cincinnati north to Toledo with numerous branch lines covering the greater part of Central Ohio. The properties absorbed and their mileage is as follows: Zanesville Railway, Light & Power Company, 15; Columbus, Newark & Zanesville, 41; Columbus, Buckeye Lake & Newark, 39; Central Market Street Railway, 20; Columbus, Grove City & Southwestern, 12; Columbus, London & Springfield, 52; Dayton, Springfield & Urbana, 45; Urbana, Bellefontaine & Northern, 40; Springfield & Western, 12; Dayton & Western, 40; Dayton & Northern, 41; Dayton & Muncie (Ohio part), 12; Lima Railways & Light, 12; Ft. Wayne, Van Wert & Lima (Ohio part), 40; Columbus & Lake Michigan (steam), 35; total operating mileage, 446. Under construction, Lima-Toledo, 75; Lima-Bellefontaine, 45; total under construction, 120.

The Schoepf syndicate also owns in Ohio the Cincinnati Northern Traction Company, the Cincinnati Interurban and the Cincinnati Traction Company, but these are not included under the new operating arrangements. The Indiana, Columbus & Eastern Railway Company has been mortgaged for $18,250,000 in two mortgages of $12,000,000 and $6,250,000 each to take over the underlying issues of the companies acquired.

J. B. Foraker, Jr., has been elected president of the new company; H. W. McAllister, vice-president; Thomas Fitzgerald, Jr., secretary-treasurer; W. Kesley Schoepf and John C. Gallagher. Mr. Schoepf is chairman of the board.

ELY SYNDICATE TAKES OVER STEUBENVILLE PROPERTY

The property of the Steubenville Traction & Light Company was transferred on July 1 to the Ohio Valley Finance Company, better known as the Ely syndicate. The transaction involved about $2,000,000. J. Charles Ross, heretofore general manager of the property, will continue with the American Gas Company, former owners of the property. The new owners have announced that they will spend about $150,000 in immediate improvements. The greater portion of the system will be double tracked, it being the intention of the syndicate to have a double-track line between Wheeling and East Liverpool. Twenty-five new cars for city and interurban service will be purchased, and extensive improvements will be made at Stanton Park, the amusement resort operated by the company.

The company has been reorganized with the following officers: Van Horn Ely, president; Edward McDonald, secretary-treasurer; J. C. Rothary, general manager. The new directors are: Van Horn Ely, Edward McDonald, William McD. Miller, J. H. Kinney and Nelson D. Miller. The deal includes the Steubenville & Pleasant Heights Railway, the new line to LeBelle, the electric illuminating and gas properties, Stanton Park, and the line to Toronto with the Toronto lighting plant. The Toronto line will be extended north from Toronto to Wellsville. The Ely syndicate owns the lines at East Liverpool, Wellsville, Chester and Rock Springs, and has a special charter for the Ohio River & Passenger Railway to construct and operate a street railway line to Beaver, where connection will be made with the Beaver Valley Traction Company reaching Rochester, Beaver Falls, Monaca, Freedom and Conway. This line is being extended through Baden and Ambridge to Leipsdale.

THE ARNOLD REPORT ON UNDERGROUND CONDUIT CONSTRUCTION AND SUBWAYS IN CHICAGO

The report of B. J. Arnold to the committee on local transportation, of the Chicago City Council, known as "Arnold Report No. 9," and referred to briefly in the issue of the STREET RAILWAY JOURNAL for July 7, was presented to the Council last week. It is devoted to a consideration of three questions, viz.: (1) Whether the trolley or the underground conduit system should be adopted in the downtown streets in Chicago. (2) The disposition of the river tunnels, that is, whether they shall be abandoned or reconstructed at a lower depth to facilitate navigation, and utilized in the future as parts of a surface transportation system, or be so reconstructed that they will at once, or ultimately, become parts of a permanent subway system; and, (3) whether any subway shall now be built, and, if any, how much.

In regard to the underground conduit vs. overhead construction, Mr. Arnold points out that, as stated in his report of 1902, it is possible to construct and operate the underground conduit in the City of Chicago. As the cars will have to use the trolley in the suburbs, it is necessary to settle upon certain places where they will change from trolley to conduit. If these places are far removed from the center of the city it will mean a very largely increased cost for the conduit construction as compared with the overhead. If near the center of the city, it will mean delays caused by changing in the zone of congested traffic. Moreover, if the latter plan is followed and only a limited amount of underground conduit construction is decided upon, and that in the strictly central districts, the benefits will not be sufficient to justify the additional cost. That is to say, the change from underground to overhead will be attended with annoyance which will substantially equal that which will arise from the use of the overhead trolley in the business district. There are other objections to the immediate construction of the underground conduit in the business district, arising from the necessity of a certain amount of sewer reconstruction in that district, and the possible installation of a high-pressure water system. The subway question is also involved and is of great importance. To construct underground conduit on streets which are likely to be used for subways within any reasonable time would be obviously uneconomic, as these conduits would have to be taken out in the event of a high-level subway being constructed in any street where conduit construction had previously been built. For instance, State Street is now one of the streets, if not the principal street, upon which underground conduit is desired from the public point of view. In the plans which Mr. Arnold has heretofore recommended for subway construction he has advised a high-level subway on State Street. If there is any probability of the construction of such a subway in the early future he thinks that it would be unwise to install an underground conduit on this street at the present time.

As it is now proposed to reserve to the city, or its licensee, the right to purchase the entire railway system for the value of the present property and additional investment for improvements, it would appear to him wise to omit the construction of any underground conduit at the present time, but to specifically reserve, in any ordinances or permits that may be granted, the right that the city may require the construction of underground conduit as soon as the subway and sewer questions have been disposed of, and the city has then determined upon a sufficient amount of conduit construction to carry the transfer points well out of the business center. Mr. Arnold recommends, however, that all feeder and transmission wires should be placed underground within a district at least as large as that prescribed by the ordinances recommended by the committee on Dec. 4, 1905.

In regard to subway construction and the river tunnels, Mr. Arnold recommends subway plan No. 2, described in his report of 1902 (published on page 145 of the STREET RAILWAY JOURNAL for Jan. 24, 1903). He states that such a system could be constructed more easily than was thought at that time, because then the Illinois Telephone & Telegraph Company contemplated the construction of some large bore subways which it has now abandoned. He suggests the advisability of confining any subway construction in the immediate future to the smallest possible amount that will take care of the traffic which is intended to pass through the river tunnels when lowered and reconstructed. He then recommends for immediate construction a low-level, single-track subway loop passing through the Van Buren Street tunnel, south on Market Street to Van Buren Street, thence proceeding eastward in Van Buren Street to Michigan Avenue, thence north in Michigan Avenue to Washington Street, thence west in Washington Street through the Washington Street tunnel. This single-loop tunnel to be connected on Market Street by a single-track, low-level tunnel between Washington and Van Buren Streets. The complete loop thus constructed would take care of the west-side traffic passing through the river tunnels until such time as it became necessary to construct a third river tunnel in Adams Street, and additional loops as shown in the completed subway plan No. 2. By retaining the present eastern outlet to the Van Buren Street tunnel, which could easily be done, since it is on private property, and does not interefer with the surface of any street, the subway loop could be brought to the surface and distributed over surface loops at any time when, through accident or otherwise, congestion occurred on the west side subway loop.

To take care of the north side traffic, which would pass through the reconstructed La Salle Street tunnel, there should be a low-level, double-track subway, extending from the La Salle Street tunnel south on La Salle Street, gradually rising to Randolph Street, where it becomes a high-level subway; thence east on Randolph Street to Clark Street where the tracks would divide, one extending eastward on Randolph Street through a single-track, high-level subway to Dearborn Street. The other track would swing south on Clark Street through a single high-level subway, and extend south on Clark Street to Monroe Street. A double-track, high-level subway should extend on Dearborn Street from Randolph Street to Monroe Street, and on Monroe Street from Clark Street to State Street, thence southward to State Street to Fourteenth Street, or whatever point the committee may determine upon as the present temporary southern entrance to this subway. A single track only would be laid at present in Monroe Street from Clark Street to Dearborn Street, and in Dearborn Street from Monroe Street to Randolph Street, and a double track in Monroe Street from Dearborn Street to State Street. This arrangement would permit a double-track subway route between the north and south sides of the city, as well as provide for subway loops for all traffic coming through the river tunnels from the north and west sides. All of these subways when constructed would be susceptible of future development in connection with the complete subway system such as was shown in the report of 1902.

If it is desired to provide for through routeing of cars, through subways from the west side to the north side, and from the west side to the south side, this can be taken care of, in Mr. Arnold's opinion, by the construction of a double-track, low-level subway on Randolph Street, beginning at La Salle Street where it would connect with the La Salle Street tunnel subway, thence west to Market Street, thence south on Market Street to Washington Street, but he does not consider the construction of this piece of subway necessary at the present time, as it would be built solely for the purpose of through routeing from the west division to the north and south divisions, which routeing can be effectually accomplished with the surface systems.

The costs of the proposed improvements will be as follows:

To construct the low-level subway loop and north and south subways, as above described and recommended, will cost approximately $4,800,000.

If the double-track connection on Randolph and Market Streets, for the purpose of through routeing, is desired it will cost an additional $40,000.

If no subways are built on Clark, Monroe and Dearborn Streets, and the double-track subway is extended on State, Randolph and Market Streets, the cost would be approximately $4,500,000.

The above figures do not include the cost of changing the river tunnels, or damages to property.

CHANGES IN PLAN OF ISSUING BROOKLYN TRANSFERS

A radical change was made by the Brooklyn Rapid Transit Company on Saturday, July 7, in the method of issuing transfers. Heretofore all transfers have been handled by the conductors, except where the interchange of traffic is large. Here transfer agents were stationed. The reasons given by the company for the change are three in number: (1) To eliminate any possibility of collusion in exchanging transfers. (2) To facilitate the work of the conductor by giving him more time for collecting fares and attending to the various other duties of his position. (3) To dissolve once for all the necessity of asking the conductor for a transfer, thus doing away with any chance for a misunderstanding between conductor and passenger. The change, while it involves untold trouble to the company and no small expense, is in line with the announced policy of the company constantly to better and extend its service.

COLUMBUS RAILWAY TAKES OPPOSITION LINES

The Schoepf syndicate, which acquired the Central Market Street Railway of Columbus, and the Appleyard interurban properties, has turned the operation of the small city line over to the Columbus Railway & Light Company. The Central Market Street Railway was built to afford an entrance for the interurban lines, the city lines in Columbus being broad gage. It owns 16 miles of track and operates under lease 15 miles belonging to two of the interurban roads. It also controls the interurban loop under lease, so that it was necessary for the Schoepf interests to buy it when they did the interurbans. The road has never been a paying investment, due to the fact that it was obliged by franchise to sell eight tickets for 25 cents, and as an independent property it was doubtful if it would even earn the interest on its bonds. It is stated that the arrangement with the Columbus Railway & Light Company is not a sale nor even a lease. The city company simply takes over the operation and agrees to operate the lines and maintain them in good physical condition and pay the bond interest if the property earns it. The routes will remain as heretofore, and it is probable that the power station will be kept in operation as at present. The change is an advantage to the patrons of the road, in that the seven for a quarter tickets of the Columbus Railway & Light Company will be accepted on the Central Market cars and transfers will be given to these lines on these tickets, and while the cheaper tickets of the Central Market Street Company will still be sold, they will not be accepted on the cars of the old company, nor will transfers be granted on them except to other Central Market Street lines.

TOLEDO & WESTERN IN RECEIVER'S HANDS

The Toledo & Western Railway Company has been placed in the hands of C. F. Franklin, general manager of the company, as receiver on complaint of A. E. Bingham, of Swampscott, Mass. The plaintiff made statement that the company owes more than $300,000, and that he cannot make levies to pay the debt because all the property is under mortgage. It appears that the financial difficulties date back a year, when the floating debt was made to take care of extensions of track into a beet sugar plant and placing numerous switches into beet sugar farms. This money was furnished by the late Luther Allen, president of the company, who died a short time later. Recently it was planned to sell the road to other interests, and an option was taken on the property by Detroit people at $15 per share. At the time the stock had been selling for more than this and as the result of a Toledo broker putting out the statement that the stock was at least worth $25 a share, a number of the stockholders refused to give their options and the deal fell through. A week ago an option on the property was given to J. R. Nutt, of Cleveland, at $6.25 a share, Mr. Nutt specifying, however, that he must secure all of the stock. The floating debt of the company is equal to $21 per share on the stock, for which the stockholders are liable. The stockholders are also liable under the double liability clause of the former Ohio law under which the company was incorporated. It is believed, therefore, that Mr. Nutt's proposition will be accepted, and that the Cleveland people will bring about a reorganization. It is unfortunate for the stockholders that the embarrassment should come at this time, because the property is said to be making good gains, and the prospects of a western connection with Indiana roads seem quite promising. This, of course, will greatly increase the earnings.

PHILADELPHIA RAPID TRANSIT COMPANY LEASES TWO ROADS

The Philadelphia Rapid Transit Company has leased for a long term of years the street railway properties owned by the Philadelphia, Morton & Swarthmore Street Railway Company and the Media, Middletown, Aston & Chester Electric Railway Company. These roads consist of about 25 miles of standard gage tracks. Until the lines have been thoroughly overhauled and refitted they will be operated independently, but steps are under way to establish a through car service between Front Street and Delaware Avenue (Philadelphia) and the towns of Media and Chester. The leases run for a term of 999 years each, and are based upon a sliding scale of the earnings of each road. What percentage is to be paid was not disclosed.

The Philadelphia, Morton & Swarthmore Company has capital stock of $600,000, of which $250,000 has been issued. It has a funded debt of $500,000, and it owns 16 miles of track fitted with 70-pound steel rails. The officers of the company are: President, Lewis G. Levick; vice-president, W. S. Hammett; secretary and treasurer, E. J. Hasse; directors, L. J. Levick, F. W. Hammett, E. J. Hasse, B. G. Jones and D. Wallerstein, Philadelphia; W. S. Hammett, Jersey City, and E. A. Hopkins, London, England.

The Media, Middletown, Aston & Chester Company has capital stock of $250,000, of which $205,300 has been issued. It has also sold $210,000 first mortgage 5 per cent gold bonds, redeemable in 1933. This company is owned by the same financial interests as the first-named corporation, and it operates that corporation's road under lease. Its officers and directors are the same as those given above.

NEW ROADS OUT OF ST. LOUIS

The Hillsboro, Kimmswick & Northern Railway Company has been chartered to build an electric railway from a connection with the United Railways Company's lines at Jefferson barracks to Hillsboro, Jefferson County, Mo., a distance of 23 miles. The company is capitalized at $300,000. The incorporators are: Chas. A. Gutke, H. W. Gutke, Anthony F. Furrer, James J. Ring, Charles F. Crane and Lee A Hall.

Another railroad is projected to Hillsboro and to the south. The promoters of the St. Louis, Hillsboro & Southern Railway, recently chartered, say they are soon to begin the construction of that line. It is understood that a right of way has practically been secured and that the project is or can be financed in a short time. H. M. Bowen, superintendent and general manager, who has the work in hand, is now in New York on business pertaining to the road.

According to a member of the company, the chartering of the Hillsboro, Kimswick & Northern Railway does not conflict in any way with the St. Louis, Hillsboro & Southern, as each has its right of way along different routes. The plan to build an electric railroad from St. Louis through Hillsboro to the south has been on foot for several years. Thomas Sneed once organized a company to build one, but his scheme fell through. Among the men back of the St. Louis, Hillsboro & Southern project are H. M. Bowen, president and general manager; H. D. Brandt and Samuel Winter. It is said both roads will connect with the proposed amusement enterprise and sanitarium at Montesano Springs.

LAKE SHORE ELECTRIC TO BUILD NEW BRANCHES

The Lake Shore Electric Railway Company, which recently formed the Sandusky, Fremont & Southern Railway Company to build a branch line from Sandusky to Fremont, has decided to extend this line south from Fremont to Fostoria or Tiffin by means of a spur line. The new lines will add about 55 miles to the Lake Shore Electric system, and will cost about $1,500,000. The proposed extension is a very important link in the great system of this district. The Fremont-Fostoria line would be in the direct route between Cleveland, Indianapolis and Dayton, and if this were built at the present time, it would save about 60 miles between Cleveland and Dayton. The Tiffin line, in connection with lines building, would afford a through route to Columbus. The Lake Shore people have been negotiating with Judge Bunn, of Tiffin, who owns a right of way from Tiffin to Fremont, and it is probable that this right of way will be used.

The Lake Shore Electric has sold $500,000 of first mortgage bonds of the Sandusky, Fremont & Southern for the purpose of building the Sandusky-Fremont section. The bonds bear interest of 5 per cent, are for thirty years, and both principal and interest are guaranteed by the Lake Shore Electric.

The Lake Shore Company has arranged for a mortgage of $2,000,000 for the consolidation of the Lorain Street Railway and the Avon Beach & Southern Railway. Of this amount $750,000 will be reserved for underlying issues and $500,000 will be sold to pay for the Avon Beach & Southern and the purchase of the Lorain Street Railway. It is probable that this fall these properties will be merged with the Lake Shore Electric. The company has spent about $200,000 in improving the Lorain Street Railway during the past few months. The Lake Shore has also arranged for the sale of $500,000 of general mortgage bonds to pay for improvements on the main line. This includes the purchase of ten new cars, double tracking between Cleveland and Lorain, the addition of a 2500-kw unit at Beach Park power station and the erection of a new sub-station for the east end of the road.

A TERMINAL STATION PROPOSED FOR BUFFALO

A terminal station is proposed for the electric railway lines centering in Buffalo. This is the announcement made by President Pierce, of the International Traction Company. The building will be located on a site yet to be selected, somewhere between the Terrace and Genessee Street, and within two blocks of Main Street, and will be completed within two years. Facts in regard to the project other than these are not available at this time.

PROGRESS IN ELECTRIFYING THE CABLE LINES IN THE "LOOP DISTRICT," CHICAGO

The changing over of the cable lines to electricity and the erection of trolleys over all the other tracks in the "Loop District" of Chicago is being pushed with all possible speed. Both the Union Traction Company and the Chicago City Railway Company have night and day gangs at work. The first work done by the Union Traction Company was to put up trolley on Adams Street, between Fifth Avenue and State Street. Heretofore the electric cars have been pulled by horses to and from Fifth Avenue. Work on Adams Street was completed Sunday, July 1, and cars were operated on it the following day. Work was then begun on Dearborn Street, and in a few days the Sedgewick Street cars, which were previously hauled by horses from Lake Street to the Polk Street depot, were operated over Dearborn Street by electricity. Work is now being pushed on the Blue Island Avenue cable line. As rapidly as possible the Milwaukee Avenue, the Madison Street cable lines and the North Side cable lines will be trolleyized, the work on each line being taken up in the order given. At the company's shops, the best cable cars are being converted into single-truck electric cars by the substitution of new trucks and the installation of wiring. In all, about 300 cars will be changed over. The first work done towards electrification of its lines by the Chicago City Railway is the erection of trolley wires on State Street as far south as Eighteenth Street, which will obviate the Archer Avenue electric cars being trailed through the down-town district behind cable cars.

TRANSPORTING TROOPS BY TROLLEY IN MASSACHUSETTS

The Boston & Worcester Street Railway Company, the trolley air line, on Saturday, July 7, transported twelve companies of infantry, the headquarters staff, band and drum corps from Chestnut Hill to the State musterfield at South Framingham, taking them in special open cars. This is the first time that an entire regiment has been transported by trolley to the musterfield, and the officers and men expressed themselves as highly pleased with the service. Arrangements have been made to transport the entire 5th Regiment, which comes from Boston, the same way. On Saturday, July 14, the company will take the regiment back from the musterfield to Chestnut Hill in fifteen open cars. The friends of the soldiers flocked to the musterfield on Sunday, and the Boston & Worcester increased the service to accommodate the traffic. The trip from Boston to the State camp is 20 miles, and the running time about 1 hour.

MEETING OF NEWMAN PROPERTIES ASSOCIATION

The semi-annual meeting of the Newman Properties Association, among whose members are numbered the electric railway and light properties controlled by the Newman interests, convened at the Imperial Hotel, Knoxville, last week. Some fifty or sixty delegates were present for the three days' session. President Jamison called the meeting to order, and after temporary organization and roll call an adjournment was taken for lunch. On the afternoon of the first day the subject, "Economical and Efficient Force for Car Barn and Shop Operation," was discussed by A. D. McWhorter, of Memphis, and C. J. Kendal, of Little Rock. "From Coal Pile to the Meter, an Analysis of Our Losses," was the next subject. This was discussed by J. A. Emery, J. P. Brown and William H. Chapman. "Some of the Difficulties of the Accounting Department" was discussed by W. J. Tharpe and H. C. Walters. "Keeping Down Operating Expenses" was discussed by C. H. Harvey, president of the local company, and E. W. Ford. Other subjects on the program were: "Preventing Accidents," H. A. Davis, E. R. Roberts, Geo. H. Harris; "Fighting Damage Suits and Claims," D. H. Cantrell, T. H. Tutwiler and C. A. Avant; "Our Meter Department, Its Organization and Operation," F. V. Underwood and J. E. Spike; "A Wideawake Purchasing Agent and His Methods," Chas. T. Doerr, C. O. Simpson; "Car Painting, How It should Be Done and How Often," W. A. McWhorter and George Swint; "Net Earnings from Park and Excursion Travel, How Much Can We Afford to Spend to Encourage Such Business," T. C. Kelley and J. A. Emery; "How Low Can and Should we Sell Current for Power?" William E. Chapman, J. M. Bradley and P. E. Mitchell. The following are the delegates who were present at the sessions: Robert Jamison, president, Birmingham; C. O. Simpson, vice-president, Little Rock; H. T. Bunn, secretary, Knoxville; L. H. Sherk, H. M. Bugler and C. M. Carry, New York; J. A. Emery, George H. Harris, W. A. McWhorter, A. M. Bradley, F. V. Underwood, C. A. Avant, Chas. T. Doerr, J. M. Ritson and Hugh Morrow, Birmingham; Percy Warner, H. A. Davis, J. P. W. Brown, N. P. Yeatman, H. C. Walters, George Swint and George D. Mills, Nashville; T. H. Tutwiler, E. W. Ford, W. H. Burroughs and C. B. Proctor, Memphis; J. H. Phillips, W. J. Tharye, E. Rick, J. Fry and C. J. Kendal, Little Rock; W. H. Chapman, W. W. Reed, Robert Duerer and Wm. M. Connelly, Houston, Tex.; C. H. Harvey, P. E. Mitchell, T. C. Kelly, Loeb Fender, E. R. Roberts, J. M. Kingston and J. E. Spike, Knoxville. Officers were elected as follows: President, Charles H. Harvey, Knoxville; vice-president, T. H. Tutwiles, Memphis; secretary and treasurer, W. J. Tharpe, of Little Rock.

COMPLETION OF THE ELECTRIC SERVICE SUPPLY COMPANY'S ORGANIZATION

The Electric Service Supplies Company announces the completion of its organization. By the purchase of the business of the Mayer & Englund Company, of Philadelphia; of Porter & Berg, Chicago; Garton-Daniels Company and Electrical Devices Company, Keokuk, Ia., it acquires all the assets and assumes all the liabilities of said companies. With increased capital, enlarged manufacturing and warehouse facilities and a united corps of executive and sales representatives, the new company earnestly solicits a continuance of the very liberal support accorded its predecessors.

ACTION POSTPONED ON BRIDGE LOOP PROPOSAL

The question of an elevated connection in New York between the Williamsburg and the Brooklyn bridges will not be considered again until the fall. The date set is September 28. This decision was reached at a meeting of the board of estimate of the city held last Friday. As has been stated previously in the Street Railway Journal, the idea is to facilitate transit by looping cars between the bridges and picking up Brooklyn passengers en route rather than to deal with passengers in the mass, as is now done at both the Williamsburg and Brooklyn Bridge terminals. The elevated plan, proposed by Bridge Commissioner Stevenson, has met with almost universal endorsement by Brooklynites. In opposition to the plan are New York interests who seem to see in the plan only a further encroachment upon streets already congested, and for the most part narrow. They favor an underground connection. President Winter, of the Brooklyn Rapid Transit Company, has said that as far as his company is concerned the proposal for a subway is out of the question. In a statement which he made a few days ago, he set forth his reasons for his opposition to the subway proposal as follows:

"The operation of a subway connection would involve conditions practically out of the question with this company. Aside from the objections to operating heavy grades on less than one-minute headway, which have been repeatedly explained, such an arrangement would call for the replacement of all of the elevated cars by others specially adapted to subway service. These, in turn, as I am informed by electrical engineers, would require a character of motor equipment which, together with the cars, would, on account of the great weight, require the practical reconstruction of the elevated structure which is now in a condition to carry the heaviest trains required in elevated service, the whole involving an expenditure of many million dollars.

"We have the greatest desire to assist to the utmost within our power, in relieving the bridge terminal conditions in Manhattan, but these objections are so serious as in our judgment to practically eliminate the subway plan from any scheme in direct connection with bridge operation."

OCEAN SHORE RAILWAY GRADED BY EARTHQUAKE

As previously noted in these columns the earthquake of April 18 damaged the roadbed of the Ocean Shore Railway, of San Francisco, to some extent by filling in excavations and throwing the grade out of alignment in one or two places. It appears now, however, according to J. B. Rogers, chief engineer of the company, that the road was also actually benefited by the earthquake to the extent of $15,000. Along the strip of coast country known as Mussel Rock Bluffs, he says, the Ocean Shore road was progressing nicely with the work of grading its roadbed when the earthquake came along and accomplished in a few seconds what the company would have taken weeks and the expenditure of many thousands of dollars to accomplish. The bluffs in question were very precipitous, and in order to secure roadbed for the electric line half way up the bluffs it became necessary to remove thousands of yards of overhanging rock and earth. This was to be accomplished by boring from above and putting in heavy charges of blasting powder. The earthquake, he says, shook down an immense amount of material, and did the work much better than it could have been done by blasting. Where a precipitous bluff stood before the earthquake, there is now a sloping hill that can be graded with comparatively little expense. Rogers says that this offsets probably half the damage which the road sustained in other places.

Regular passenger service was inaugurated on the southern end of the Ocean Shore Railway on June 15, when a special excursion of business men went over the road from Santa Cruz to San Vicente. Two trains a day will be used on the 12-mile run for the present. Construction work on the Ocean Shore Road was commenced last September, and the management expects to have through trains running between Santa Cruz and San Francisco one year from this date. The first section of the track is in good condition, the return run from Wilder's Station to Santa Cruz, a distance of 4 miles, being made in 5½ minutes. Three steam shovels and 300 men are at work on this section of track reducing grades and filling trestles.

OUTING OF NEW YORK CITY EMPLOYEES

The ninth annual outing and games of the employees of the Broadway, Columbus, Lenox, Seventh and Sixth Avenue divisions of the New York City Railway Company were held at Donnelly's grove, College Point, L. I., on Wednesday, July 4. The steamer "Richmond," carrying the party, left the foot of West Fiftieth Street, New York, at 9 o'clock.

INTERBOROUGH-METROPOLITAN OFFICERS

The first official list of the officers and directors of the Interborough-Metropolitan Company appears in the application to list the securities of the new corporation, which application has been approved by the governing committee of the Stock Exchange. The officers of the company are: August Belmont, president; Charles A. Conant, E. Mora Davidson and W. J. B. Mills, vice-presidents; J. K. Corbiere, treasurer; James I. Burke, assistant treasurer; H. M. Fisher, secretary; John F. Buck, James I. Burke and G. E. Little, assistant secretaries. The following temporary vice-presidents and assistant secretaries have also been appointed: Vice-presidents, August Belmont, Jr., A. Birtner, B. Hamburger, William Cahill; assistant secretaries, W. C. Wells, Louis Neilson and W. H. Raab. The following are the members of the board of directors: Joseph S. Auerbach, August Belmont, Edward J. Berwind, Paul D. Cravath, John D. Crimmins, E. Mora Davison, Thomas P. Fowler, Andrew Freedman, Solomon Guggenheimer, James Jourdan, Gardiner M. Lane, John B. McDonald, De Lancey Nicoll, Walter G. Oakman, Morton F. Plant, Thomas F. Ryan, Robert A. C. Smith, Cornelius Vanderbilt, George W. Wickersham, Peter A. B. Widener and George W. Young. The members of the executive committee of the company at the present time are as follows: August Belmont, Edward J. Berwind, Paul D. Cravath, Andrew Freedman, James Jourdan, Walter G. Oakman, Thomas F. Ryan, Cornelius Vanderbilt and Peter A. B. Widener.

The company's securities placed on the regular list of the New York Stock Exchange are: Sixty-seven million four hundred and six thousand dollars of the $70,000,000 collateral trust 4½ per cent gold bonds, $45,284,600 of the $55,000,000 5 per cent cumulative preferred stock, and $92,260,100 of the $100,000,000 common stock. The remaining amounts of the securities of the three classes, which the committee on stock list are authorized to add to the regular list from time to time, represent securities of the Interborough Rapid Transit Company, the Metropolitan Street Railway Company and the Metropolitan Securities Company not yet turned in by their owners for exchange into securities of the Interborough-Metropolitan Company.

CLEVELAND TRACTION SITUATION

The Cleveland Electric Railway Company has abandoned all attempts to negotiate with Mayor Johnson on the street railway franchise situation, and in a communication this week to the City Council the company announced that it would shortly present a formal proposition for a renewal franchise grant on the basis of a material reduction in fare. It is generally believed that this proposition will be on a basis of seven tickets for a quarter with limited transfers.

The Cleveland Electric Railway Company has acquired by purchase the right to construct a line on Gordon Avenue, which street is being sought for by the new company as a route for a cross-town line. It appears that the original owners in dedicating the street to the city retained an ownership of 12 feet on each side of the street and the old company now acquires these rights. The city promises to contest this claim.

The Cleveland Electric Railway Company has received in a formal manner, and is now considering, the proposition to lease the property made by a syndicate headed by Henry Everett, who formerly controlled the road. The terms of the proposition have not been made public, but is understood to be on the basis of guaranteed dividend for the stock.

The Municipal Traction Company, which has acquired by lease the property and franchises of the Forest City Railway Company, has announced the following management: A. B. Du Pont, of Detroit, president and general manager; W. B. Colver, secretary; Fred C. Alber, assistant general manager, and Edward Widenson, treasurer. The new company is pushing construction work with large forces in several parts of the city. A site for a power house has been selected and it is stated that contracts for the equipment are to be placed at once. Contracts for cars are said to have been closed, but the car builders in Cleveland say that they know nothing of the order. It is announced that no car houses will be built by the new company, but that cars will be stored out of doors.

The Forest City Company has just applied to the Council for franchises over twelve routes in various parts of the city. These will have to be open for competitive bidding, and the Cleveland Electric has expressed its intention of submitting proposals over some of the routes. Officials of the Forest City Company claim that the first offering of $400,000 stock of the new company has been oversubscribed. Mayor Dunne, of Chicago, was one of the subscribers. The "Cleveland Press," a sensational sheet, has taken the unusual step of announcing that it has investigated the proposition of the new low fare company, and in a formal manner offers to guarantee the 6 per cent interest on the stock of the new company, and to buy the stock at cost and accrued interest at any time within two years, to all who subscribe through the publisher of the paper. This has had the effect of bringing in many subscriptions for one or two shares.

The city authorities and the Cleveland Electric Railway Company are likely to get into court over the question of paving the devil strip on Broadway. The city claims that the company is obliged by franchise to pave the devil strip. The company denies this, but offered to pave the strip with brick which had been taken from other streets. It started to do this, and the city stopped the work. The city retaliated by attempting to prevent the Akron-Cleveland Interurban cars from entering over this route. The city solicitor, however, has advised the authorities that they have taken the wrong course, and that they could only bar the interurbans on the question of the weight of the cars showing their tendency to injure the pavement. This, of course, would prevent all interurbans entering the city. At its meeting a few evenings ago the Council received a resolution revoking the franchise of the company on Broadway. The contest hinges upon the meaning of the clause covering the question of paving between the track. The clause says: "The company shall pave and maintain the pavement in the space included between the outer lines of the two rails of each of its tracks." There are several important routes on which the conditions regarding pavement are the same as this one, and the settlement of this case is of considerable importance to the company.

STREET RAILWAY PATENTS

[This department is conducted by Rosenbaum & Stockbridge, patent attorneys, 140 Nassau Street, New York.]

UNITED STATES PATENTS ISSUED JULY 3, 1906.

824,765. Fender; Robert S. Watson, Bay City, Mich. App. filed Oct. 28, 1905. Details of construction.

825,833. Trolley; Joseph Tetlow, Saco, Maine. App. filed Nov. 7, 1904. A removable tread is provided and the flanges of the wheel are held in contact therewith by spring pressure. The wheel has ball bearings, which are adjustable to compensate for wear.

824,834. Trolley; Joseph Tetlow, Saco, Maine. App. filed April 19, 1905. Relates to modification of the preceding patent, and particularly to the method of supporting the removable tread of the wheel.

824,845. Rail-Bond; Walter G. Clark, Seattle, Wash. App. filed Oct. 13, 1905. A single piece rail-bond formed of a flexible body having integral end portions which are flattened and each provided with a plurality of perforations.

824,873. Lubricator; Eugene R. Keefe, Bellows Falls, Vt. App. filed April 4, 1906. A lubricant receptacle mounted adjacent the car wheels, has a feed-wheel passing through a slot in the receptacle, and means whereby said feeding wheel may be brought into contact with the flanges of the car wheels by the lateral movement of the car body when rounding curves.

824,986. Car Fender; Benjamin B. Jenkins, Toronto, Canada. App. filed Sept. 27, 1905. Details of construction.

825,130. Amusement Apparatus; Johann Jurgens, New York, N. Y. App. filed Nov. 6, 1905. A pleasure railway consisting of a platform having auxiliary outgoing and incoming platforms, an endless track arranged surrounding the platform, and cars moving from the platform over the track and surmounted by gondolas to which a rocking motion is imparted.

825,142. Trolley Harp; Hermann Mangold, Carnot, Pa. App. filed Nov. 10, 1905. A pair of discs are revolubly supported on the harp so as to extend over the top of the wheel and prevent the escape of the conductor therefrom. In passing hangers the discs are laterally displaced.

825,172. Railway Track Structure; Victor Angerer, Ridley Park, Pa. App. filed April 26, 1906. A track structure having arms, a rail mounted in the space between the arms, spacing blocks, and means for drawing the rail firmly in contact with the spacing blocks.

825,236. Cable or Wire Hanger; Richard C. McKiliget, New Orleans, La. App. filed Sept. 27, 1905. Two jaws are connected by a strap which is passed around the trolley conductor. When the two jaws are forced together by a suitable nut, the strap is tightly bent around the conductor to hold the same in place.

PERSONAL MENTION

MR. J. E. FEIGHT retired on July 1 as general manager of the Dayton & Northern and the Dayton & Muncie Traction Companies, as these roads passed into the hands of the Schoepf syndicate on the date mentioned.

MR. JOHN N. OSBORNE, formerly agent of the Wabash-Lackawanna Despatch in Toledo, has been appointed general freight and passenger agent of the Toledo, Port Clinton & Lakeside Railway, with headquarters in the Gardner Building, Toledo.

MR. WILLIAM R. ALBERGER, formerly of the Santa Fe Railroad in San Francisco and president of the Transportation Club in that city, has been appointed traffic manager of the San Francisco, Oakland & San Jose Railroad, commonly known as the Key Route.

JOHN A. KAISER, formerly foreman of the railroad shops of the Pennsylvania Railroad Company, at Todd's Cut, has been appointed superintendent of the electric line to be opened by the West Jersey & Seashore Railway Company from Camden to Atlantic City. The line will open this month.

MR. W. B. TARKINGTON, superintendent of the Detroit, Monroe & Toledo Short Line, has resigned, and Mr. E. B. Taylor, Jr., at present superintendent of the Detroit City lines of the Detroit United Railway, has been appointed to the place. The office of assistant superintendent of the Short Line has been created, and Mr. Murdock McCauley, at present superintendent of the Orchard Lake division of the Detroit United, has been appointed to the position. Mr. McCauley will have his headquarters at Monroe, while the new superintendent will be located in Detroit. It is understood that Mr. Tarkington will go with the new line building out of Chicago, in which Mr. Mathew Slush, formerly president of the Short Line, is interested.

MR. GEORGE C. TOWLE, formerly manager of the Syracuse & South Bay Railway Company, has been appointed by the American Railways Company to assume the management of the Peoples' Street Railway, of Dayton, succeeding the late Mr. Joseph L. Breen, who met with a fatal accident while in the performance of his duties some months ago.

MR. VALENTINE WINTERS, president of the Dayton & Western Traction Company, who has retired from active interest in the electric railway business through the leasing of his property to the Schoepf syndicate, will devote his attention to the banking business in Dayton, succeeding his father as president of the Winters National Bank of that city.

MR. WALTER A. PEARSON, formerly electric engineer for the New York City Railway Company, has been appointed chief engineer of Electric Development Company and Toronto-Niagara Power Company. Mr. J. W. Putnam, superintendent of lines and feeder of the New York City Railway Company, will take charge of transmission lines under Mr. Pearson.

MR. C. M. PAXTON has been appointed general manager of the Dayton & Troy Electric Railway Company and the Piqua Street Railway Company, of Piqua. He will have his headquarters at Tippecanoe City, Ohio. Mr. Paxton is a young man who has made an excellent record in the traction business in the last four years, having advanced from bookkeeper in the offices of the Dayton & Troy to the offices of auditor, traffic manager, secretary, and now general manager.

MR. GARDINER C. SIMS, having recently been elected to the presidency of the William A. Harris Steam Engine Company, of Providence, R. I., builders of Corliss engines, has resigned his position as general manager of the Marine Engine & Machine Company, of Harrison, N. J., and will return to Providence to assume his duties there. The William A. Harris Steam Engine Company has purchased a large tract of land at Central Falls, R. I., and plans are now being prepared for the building of new works.

MR. THOMAS K. BELL, chief engineer for William Wharton, Jr., & Company, Inc., of Philadelphia, has resigned this office to accept the position of chief engineer for the Interstate Railways System. Mr. Bell has been associated with the Wharton Company for thirteen years, and for the last four years, as chief engineer of the company, has had full charge of all its engineering matters. Mr. Bell began his business career with Isaac A. Shepard & Company, iron founders, of Baltimore and Philadelphia, and retained this connection for eight years, passing through the various branches of the iron industry and serving his apprenticeship as a practical iron moulder. After this experience he completed a course at Maryland Institute, graduating in 1890. After graduation he spent one year with the Pittsburg Locomotive Works, in general engineering work, and then one year with R. D. Wood & Company, of Camden, N. J., on special hydraulic tool and machine work. In 1893 he entered the employ of the Wharton Company as draughtsman, and in 1899 was made chief draughtsman. About 1904 he was made chief engineer of the company. In this capacity Mr. Bell has established an enviable reputation and is a recognized authority on design and construction of special work and permanent way, both for steam railroads and electric railways. As chief engineer of the Interstate Railways System, Mr. Bell will have general charge of about 430 miles of track, comprising properties located in Trenton, N. J., Norristown, Pa., Reading, Pa., Wilkesbarre, Pa., Wilmington, Del., as well as a number of other important city and suburban lines in Delaware, Pennsylvania and New Jersey. One of his first responsibilities will be thoroughly to overhaul the properties at Trenton. Mr. Bell's permanent headquarters after Sept. 1 will be in the Merchant & Marine Building, Philadelphia, but he will open temporary offices in Trenton while the construction work is in progress in that locality.

T. K. BELL