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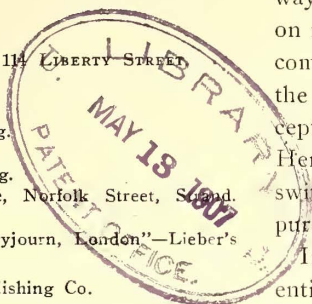
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*Of this issue of the Street Railway Journal, 8200 copies are printed. Total circulation for 1907 to date, 155,350 copies, an average of 8176 copies per week.*

## Electric Track Switches in Interurban Service

The automatic electric track switch has come into such wide use on city routes where the traffic is heavy that it is pertinent to inquire whether in some cases interurban lines cannot profitably consider the adoption of this means of reducing delays at intersecting points on certain parts of the routes traversed by through cars. Branch line

service on interurban systems is not, as a rule, conducted by deflecting main line cars from trunk routes; the headway between cars is much greater than that encountered on most urban lines, and the extensive use of switch types common to steam railroad practice does not encourage the development of semi-automatic switch mechanism except in layouts where interlocking apparatus is justified. Hence there is little apparent need of the electric track switch, either in its usual or a more specialized form, on purely interurban track at the present time.

In the city sections of interurban runs the conditions are entirely different. As through electric railway practice broadens in scope, the need of reducing all delays to the lowest possible amount becomes absolutely essential to first-class service. It is unfortunately the case, in many instances, that a very high percentage of the total running time of interurban cars between terminals is wasted in delays in the city streets at the ends of the routes. Many of these delays cannot be avoided, but others can be eliminated to a large extent by giving the through car the right of way over the following or intersecting local, and by providing for a clear run without a single preventable stop being made. Valuable time is often consumed by obliging through car crews to stop and set track switches by hand in leaving the city streets or in passing branch tracks in urban territory. Electric track switches at these points will frequently well repay their cost. It may not seem that these extra stops are important, but they are loose ends in the operating scheme and have a direct connection with the tediousness or comfort of a busy man's trip.

## Why Rapid Transit Failed

A critical study recently made of a regular interurban run of 14 miles between terminals over a double-track road in the East, suggests a number of points of interest to companies endeavoring to furnish high-speed service in well populated territory. The car was equipped with four motors, capable of attaining a maximum speed of about 35 m. p. h.; the schedule time over the route was 1 hour and 15 minutes, and the trip was taken in the middle of the forenoon when traffic was light. As is frequently the case in the East, only a small part of the run, possibly 4 miles, was made on a private right of way, the balance of the route being in the public streets and roads. The car was operated in strictly urban territory about 40 minutes of the total running time.

In the run of 14 miles, which was made on schedule time, the total number of full stops made by the car was forty-one, the average being about three stops per mile. Numerous slow-downs were also noted, and the total time consumed by all the stops was 6 minutes 42 seconds, or 9.05 per cent of the schedule. Only once in the entire trip did the car attain the full speed of which its motors were capable. The streets were not congested with general travel, with the ex-

ception of about 3 miles of track in the terminal city where the car started. These 3 miles were covered in 15 minutes.

The company fulfilled its promised schedule; carried its passengers comfortably to their destinations at from 50 to 60 per cent of the fares charged by a competing steam line, yet, rapid transit, as made possible by a costly equipment in roadbed, rolling stock and motive power, failed. The equipment was not utilized to anything like its full capacity, and the schedule speed which resulted—11.2 m. p. h.—was rightly deemed unworthy of the possibilities of modern electric railway engineering.

The reason why better time was not made on this run was clearly due to two fundamental obstacles—the large number of stops and slow-downs, and the failure of the company to insist on sharp, clean service at points where slow movement was necessary. The longest period of running without a stop was one of 7 minutes, a second like period of 6 minutes being noted. The average length of stop, 9.8 seconds, was doubtless held at this minimum by the use of pneumatic doors at each vestibule, controlled by the motorman. The stops were too close together for the best service; in one case the car came to a standstill just before passing over a switch leading to a branch route, accelerated to a speed of 5 or 6 m. p. h. and stopped again on the other side of the switch to receive passengers. Obviously the white post should have been located in advance of the switch to avoid the double delay. On the last half mile of the run, which was a single track in a narrow street, a double stop, aggregating 2 minutes 48 seconds, was made on a turnout to allow a local car to pass, so that the through passengers, anxious to reach the end of their journey, were held up an undue time.

It is pertinent to inquire the advantage of making better time on such a road, which is inherently a great addition to the transportation facilities of the territory served. The nub of the whole question is the effective competition of the steam road. There is no doubt that many patrons make the journey by steam because of the slow schedule of the electric line, which might recapture a good share of the traffic if the equipment were properly forced over the road. The extra fare of 15 cents required on the steam line is an insignificant matter to the average business man, and if a limited service on a 45-minute schedule were put in effect by the electric road there is little doubt that it would be patronized to a much greater extent.

### Public Service as a Public Trust

The address of President Hadley at the dedication of the United Engineering Societies' Building, of which we printed some extracts at the time, but which appears in its entirety in the Transactions of the American Institute of Electrical Engineers, is worthy of careful reading. Dr. Hadley points out that the old ideas of a dominant professional class, following upon the ruder days when there was a dominant military class, has in these more peaceful times of rushing industry given place to an appreciation of active achievement, so that at last the engineer had begun to come into his own. More than this, he must accept the obligations which come from this condition—obligations to society which cannot be shunned. The successful engineer leaves behind him enduring monuments in bene-

fits conferred upon his fellowmen. It is a cheering sign of the times when one realizes the civic awakening that has come out of times too often condemned as wholly sordid. An era of great industrial prosperity seems sometimes, at first thought, to choke idealism and foster social decline; yet one must remember that, historically, there is scant evidence to support this depressing conception. In early centuries there were no periods more filled with healthy commercial activity than the "Golden Age" of Augustus Cæsar and the time of the Italian Renaissance. Yet these were precisely the times when there was also splendid intellectual and artistic achievement. Similarly, later in the age of Elizabeth, with its awakened world-commerce, came the greatest day of England's intellectual progress prior to the nineteenth century.

Perhaps the fact is that with general prosperity, attained sometimes as it may be by selfish means for selfish ends, there yet comes a lifting of humanity out of the grinding struggle for existence that gives at last a chance for better things. Certain it is that within the last few years there has been a great quickening of the civic spirit, an awakening of devotion to the common good, that is the most cheering sign of the century begun. And we cannot refrain from noting the feeling of responsibility to mankind that shows itself among those who are conducting public enterprises. In spite of great combinations of capital, sometimes improperly used, there is daily growing among those whose relations are with the public a feeling that they have public duties to perform. In our own street railway field, often criticised, as it is, we can see a gradual evolution of the idea of public duty, looking away from the railroad as a purely private enterprise toward the conception of it as in some sense a public trust. No other business comes into so intimate touch with so many people, and through recent years there has certainly been a far quicker response to their needs than ever before. Their needs indeed are greater and not so easily satisfied as once they were, hence the necessity for greater activity; but there is a growing spirit of public service that is certainly making itself felt. One does not have to go back many years to find railways wrangling in utter disregard of the effect of their bickerings upon public needs. To-day they are apt quickly to sink dissensions and get to work. Call the motives selfish if you like, or charge it all to the gathering force of public opinion, the fact is that the change has come and every year makes it more evident. In one way or another it is part of a growing commercial feeling which makes for a better civic life and for larger achievements in the growth of civilization.

A like sentiment is expressed in the report of the committee on municipal ownership which was presented at the Columbus Convention, but has only just been made public. Where President Hadley traced the development of the engineering and ethical ideal through its history, the committee, of which Mr. Charles D. Wyman, of Boston, is the chairman, discusses the much briefer history of public service corporations and their arrival at the goal presented by the maxim that a public service is a public trust. For many reasons, which the report fully discusses, it is most inadvisable to place the operation of a large public service in the hands of the municipalities; but if the cor-

poration receives the cordial co-operation of the authorities in its efforts to improve its service and then administers this service in the modern spirit described in the address and report mentioned, the most satisfactory results should be secured.

### The Cleveland Situation

From the people's standpoint the street railway situation in Cleveland has assumed an alarming phase. On two of the main arteries service has been entirely suspended, and, owing to difference of opinion as to the validity of franchises granted the Forest City Railway Company and the Low Fare Railway Company, together with the determined fight of the Cleveland Electric for a renewal, a long legal battle will probably precede a resumption of traffic, no matter which side is finally declared the victor. Franchises of the old company on several other lines will expire next spring and the matter will probably become more complicated than ever.

This condition has been brought about through a plank in Tom L. Johnson's original Mayoralty campaign to secure a three-cent fare for the people of Cleveland. Although he had been an operator of electric railways on a large scale, he claimed that the local system could be operated on this basis, and has adhered to the point, notwithstanding the fact that the Cleveland Electric Railway Company has spent large sums of money in demonstrating to him that a good service, with plenty of first-class cars, cannot be maintained at that rate with sufficient margin to induce people to purchase the securities. For several years this argument has been kept up between the company and the Mayor, with tests of the zone idea and the six-for-a-quarter plan, but none of them seemed to convince Mr. Johnson that the company should not come down to flat three cents.

Finally, as a means of bringing the company to terms, the Forest City Railway Company was organized under the guiding hand of the Mayor with three-cent fares as its basis, and about 11 miles of track have been constructed and put into operation. However, it apparently commences at no place and ends at no place, the cars now reaching the center of the city over the Cleveland Electric's tracks. The Forest City Railway Company was attacked by the Cleveland Electric forces on the ground that Mayor Johnson is financially interested in it. This suit is still pending in the courts, but to get around a possible adverse decision, the Low Fare Railway Company was organized and given grants around the Erie Street cemetery on the East Side, with the right to apply for extensions anywhere and everywhere. This has been dubbed the "graveyard" company, owing to the fact that all construction so far has been in the vicinity of the cemetery, and, in fact, a number of poles have been set within the enclosure of the resting place of the dead. A track has been laid to connect with the Euclid Avenue line of the Cleveland Electric, but actual connection has been held up under an injunction on the ground that the company must have the consents of the property owners on Euclid Avenue to operate its cars.

Grants were given the Forest City Railway Company to operate on Central Avenue and Quincy Street before the

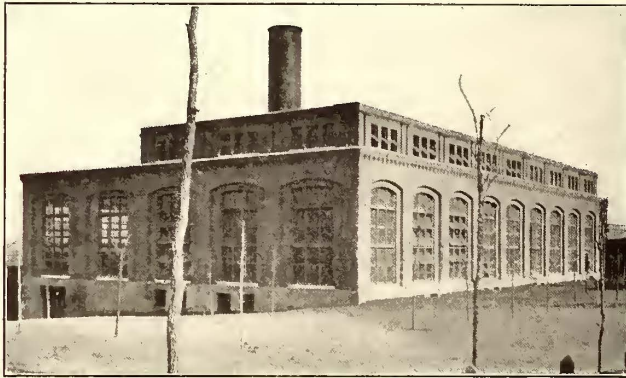
decision of the United States Supreme Court was rendered declaring the franchises of the old company had expired, the City Council assuming that this was true; but since the "financial interest" suit was instituted there has been a hesitancy on the part of the company to press its claims, the city administration apparently feeling that the grants would not stand the investigation of the courts. Within the past week, therefore, a franchise ordinance for the Low Fare Railway Company has been railroaded through the Council for Central Avenue and Quincy Street, notwithstanding the fact that all but two Councilmen representing that territory fought against the measure and a petition containing 4000 names of people affected was presented, asking that the franchise of the old company be renewed.

This has not been a fight of one corporation against another for the ascendancy, but of Mayor Johnson and the Council, which is under his control, against the Cleveland Electric Railway Company. It has been a war in which all the machinery of a great city has been brought to bear against a company because it would not meekly obey the behests of Mr. Johnson, who has proved himself first, last and all the time a politician, although ostensibly fighting for the rights of the people. If the latter idea was the one aim of his administration, great honor would be due him as a reformer and a philanthropist; but that this is not true is shown both by the fact that he absolutely refused to consider the offer of the old company to sell seven tickets for a quarter, when the proposition would have been perfectly satisfactory to the people, and again refused to consider the lease of the property of the Cleveland Electric to a holding company when he was asked to guarantee that the fare inside the city limits would never be more than three cents and five cents outside. To be sure, he afterward recanted on this proposition, but not until the Cleveland Electric had once and for all called negotiations with the proposed holding company off. To cap the climax here, he endeavored to place the responsibility of failure to lease upon the shoulders of the Cleveland Electric officers.

The better class of people in Cleveland do not feel that Mayor Johnson is sincere in his efforts to secure a three-cent fare or that he is consistent in his negotiations with the old company. He acts and talks as if the whole business is with him, as the representative of the city, and that no proposition must be considered unless it exactly accords with his ideas. He refused to accept the offer of seven tickets for a quarter, when it is a better rate than is enjoyed in any other city of the size in the country. He wanted to limit the reduced fare to the city boundaries and thus enforce congestion in the poor districts of the city, with its resultant suffering and demoralization, while there is plenty of good territory and fresh air in the districts reached by the various lines of the old company. His ideas are at variance with what appears to most people to be really for the good of the city. People are growing tired of the fight, as they did in Chicago. They see the stubbornness of Mr. Johnson as well as the decision of the old company to protect its interests, and it is believed that he is losing ground. The settlement, apparently, must come through an arbitration, as the Cleveland Electric has offered, or at the polls this fall.

## THE POWER STATION OF THE LITTLE ROCK RAILWAY & ELECTRIC COMPANY

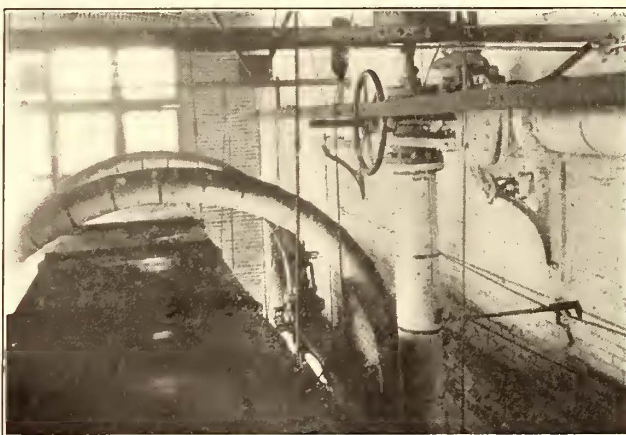
In general design and in many details the power station of the Little Rock Railway & Electric Company departs considerably from the usual type of modern power station. This station was completed about two years ago to take the place of one in which the generators were located on the



FRONT VIEW OF THE LITTLE ROCK POWER PLANT

floor above the boilers. The notable features of the plant are the provisions for light and ventilation in the construction of the building, the vertical loop system of the main steam and of the main feeder headers and the cylinder lubricating system. The station is located a few blocks west of the business portion of Little Rock. Surrounding the building on three sides is a plot of ground about 100 ft. wide, kept in grass and planted with trees and flowers. In the rear is a coal switch.

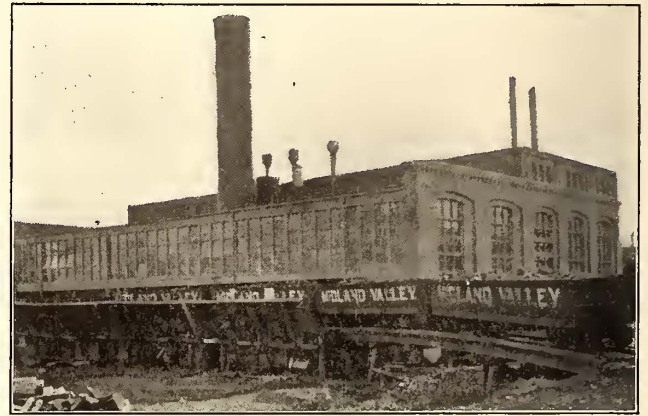
The building is a brick and steel structure, with concrete foundations which are carried up to the window openings, steel roof trusses and tile roofs. The appearance of the



EAST END OF THE VERTICAL LOOP. BOILER MAINS PASSING OVER BREECHING AND ENGINE MAIN DESCENDING FROM UPPER LINE OF LOOP

exterior of the building is heightened considerably by the salmon-colored brick with which the walls are faced. The size and number of the window openings are particularly noticeable. All of the windows are provided with attachments for swinging them open. The rear side of the building may be opened completely. Kinnear rolling steel doors with steel columns between them form the lower portion of the rear wall, and the upper portion is made up entirely of windows which may be swung open. Further provision for ventilation is made by slat ventilators placed in the roof

over the boiler room. The upper tier of windows in the engine room are just under the roof and consequently no ventilators are required in this room. The building is 165 ft. long and 110 ft. 4 ins. wide. The boiler room in the rear, which is 46 ft. wide, is constructed with its floor level 15 ft. 6 ins. below that of the engine room. Under the entire engine room is a basement with its floor level 10 ft.



REAR OF STATION, SHOWING COAL TRACKS AND BINS UNDER THEM

below that of the main floor. All of the condenser apparatus is located in a pit under the engine room, the floor of the pit being 16 ft. below the boiler room floor and 31 ft. 6 ins. below that of the engine room. The station is not built on the "unit plan," yet the loop system of boiler feed



BOILER ROOM, SHOWING THE ROLLING STEEL DOORS AND METHOD OF FEEDING

mains and main steam headers and the installation of duplicate condenser apparatus permits, with the exception of the use of one stack, independent operation of the two halves of the plant.

### BOILERS

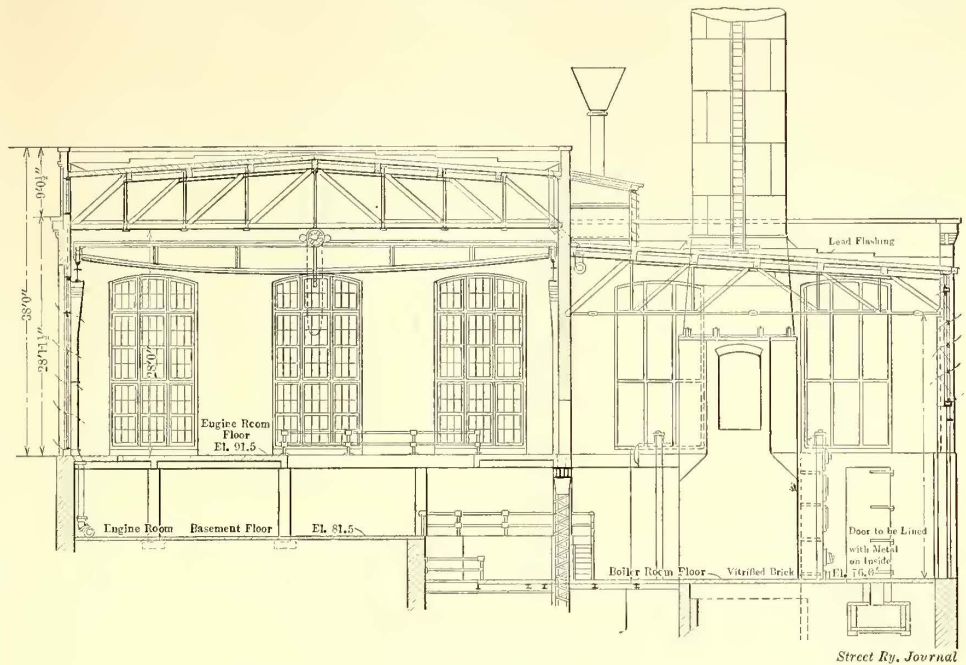
The boiler equipment consists of eight 550-hp hand-fired Aultman & Taylor water-tube boilers installed in four separate batteries. Three of the boilers are provided with Foster superheaters, but in the remainder no provision for superheating is made. One stack into which the breech-

ings from all the boilers are carried is located between the two central batteries. The stack proper, which rests on a brick stub 30 ft. high, is of steel, 11 ft. in diameter and 70 ft. high, and has inside a 4-in. brick lining. The top of the stack is only about 100 ft. above the boiler room floor, the unusually low height being due to the fact that the boilers are provided with forced draft.

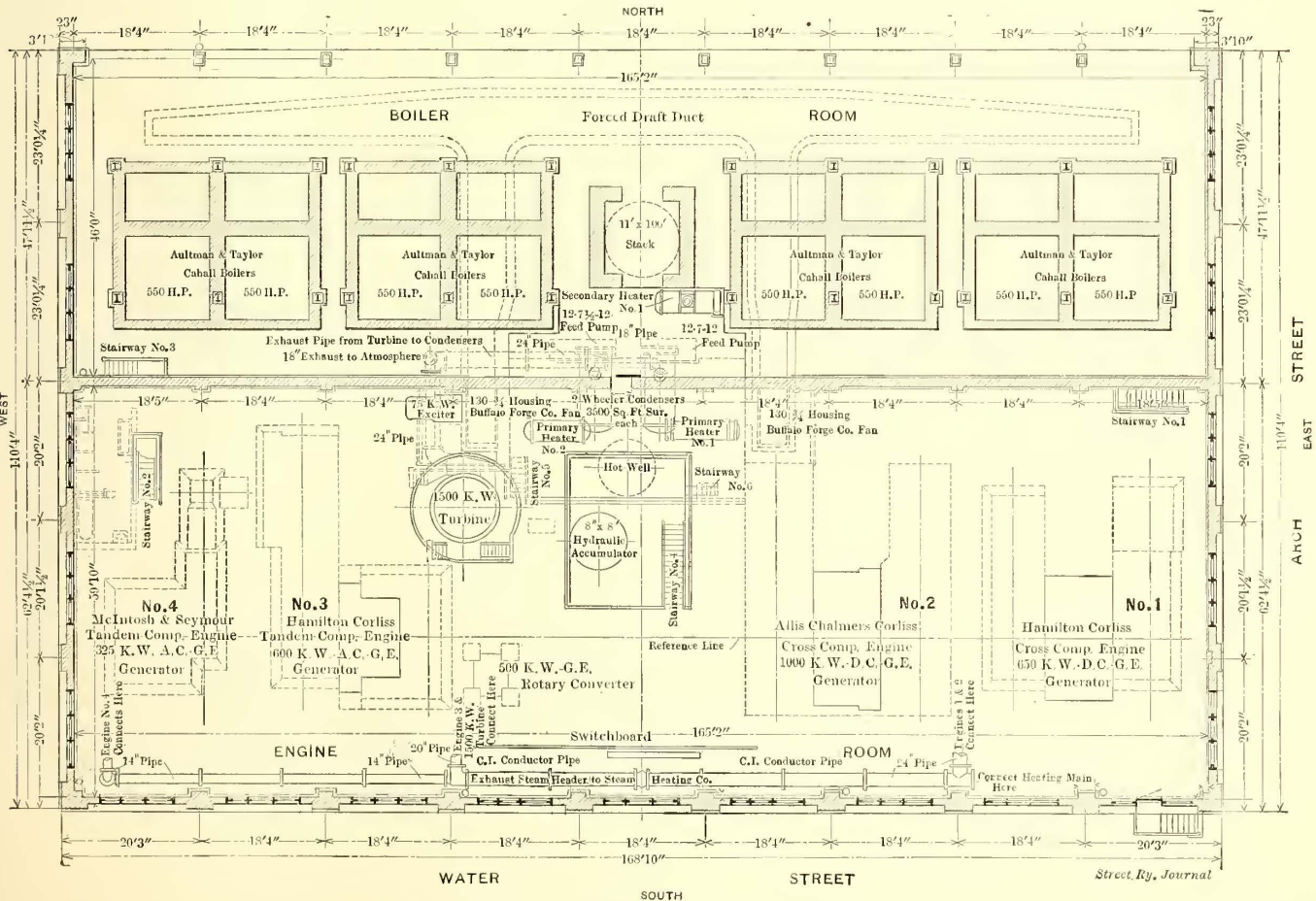
A forced-draught duct built of concrete extends under the floor in front of all of the boilers. This is connected to two lateral ducts each of which leads to a 130-in. steam-driven Buffalo Forge Company fan installed in the engine room basement. Forced draft is used only when the boilers are heavily loaded.

The switch track already mentioned as running along the rear side of the building has under it a wood hopper. Coal unloaded from the cars falls just outside the rolling steel

main is carried under the floor just in front of all of the boilers. A similar feed line from a similar pump runs just above the front of the boilers. At each battery the two



TRANSVERSE SECTION



PLAN OF LITTLE ROCK POWER HOUSE

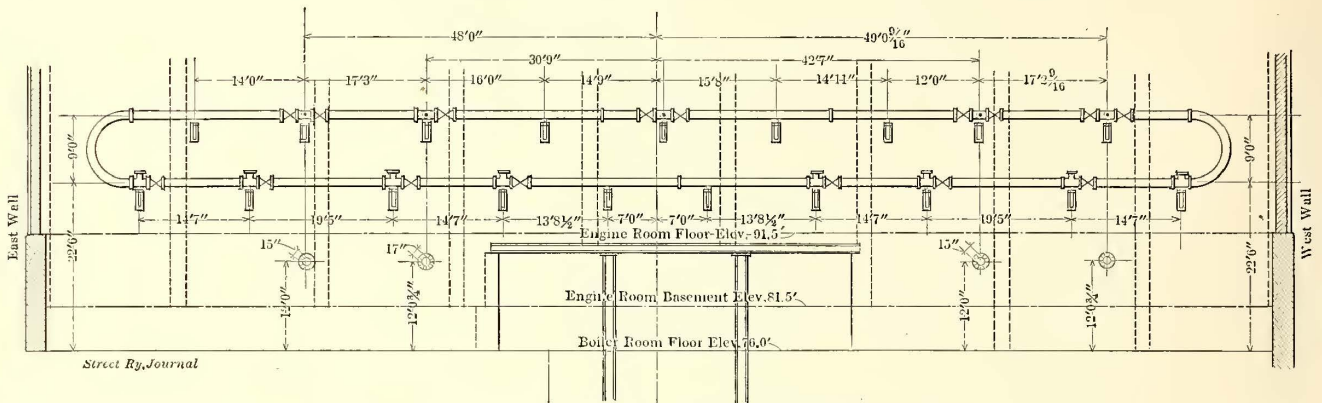
doors of the boiler room and is wheeled into the boiler room in barrows. The loop system of the boiler feed mains has already been referred to. From a 14-in. x 9-in. x 18-in. Blake duplex outside-packed plunger pump, installed on the boiler room floor behind the smoke stack, a 4-in. feed

feed lines are connected by a 3-in. riser. The feed line for the three drums of each boiler is taken off this riser between two globe valves in the riser. This arrangement permits feeding any or all of the boilers from either or both of the pumps.

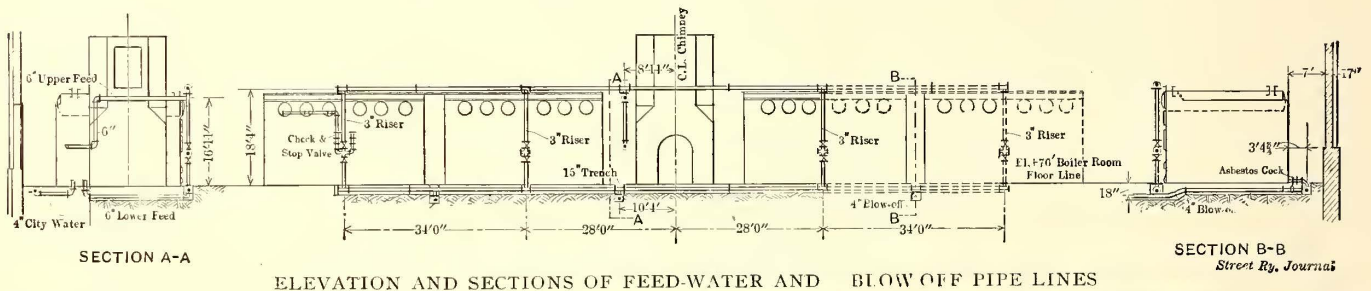
MAIN STEAM HEADER

The vertical loop system of the main steam headers consists of two lines of 10-in. pipe placed one above the other with centers 9 ft. apart and connected to each other at both ends by return bends. The boilers feed into the lower section of the loop and the mains to the engines are taken

turbine exciter set. The two direct-current units consist of an Allis-Chalmers Corliss cross-compound engine driving a 1000-kw, 600-volt General Electric generator. The other units include the turbo-generator, a Hamilton-Corliss engine driving a 600-kw generator, and a McIntosh-Seymour engine connected to a 325-kw generator. Both of these



VERTICAL LOOP SYSTEM OF THE MAIN STEAM HEADER

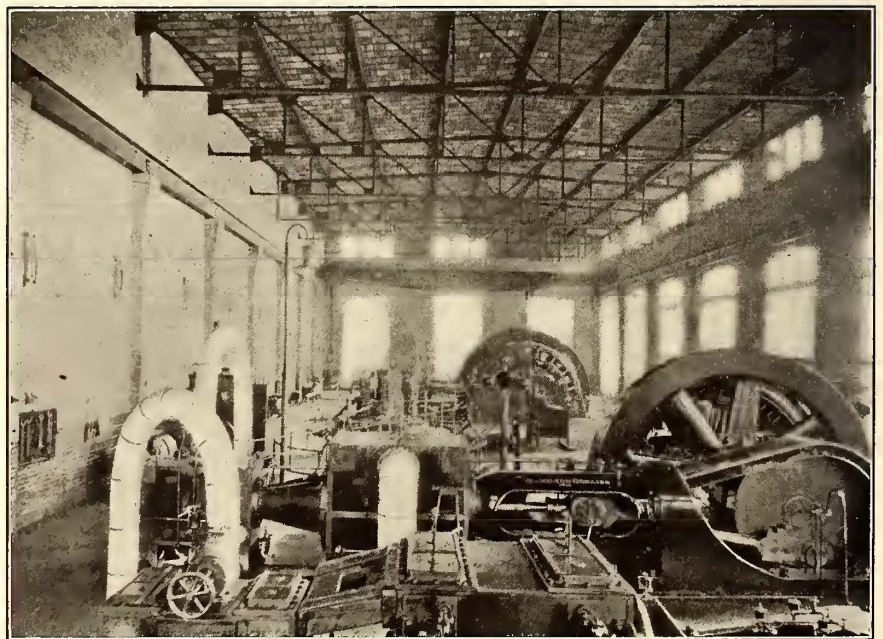


ELEVATION AND SECTIONS OF FEED-WATER AND BLOW OFF PIPE LINES

off from the upper line. Between each boiler main a gate valve is placed in the main header and each engine main is taken off the header between two valves. The location of the valves it may be seen necessitates only one boiler being cut out in case of derangement to the lower portion of the header, and it would be possible to remove or repair sections of the upper portion of the header without shutting down any of the engines or boilers. All of the heavy piping connected to the main headers is made with long sweeping steel bends. The boiler mains make a semi-circular bend over the boiler breeching, while the engine mains drop down from the steam headers almost to the floor, pass horizontally through the adjacent wall and then each is carried up through the engine room floor and to its engine by a 90-deg. and a 180-deg. bend. The main to the turbine, however, does not come above the engine room floor. Although the manner in which steam is taken from the headers reduces the liability of entrained moisture being carried over with the steam, separators are placed in each engine main at the lowest point. The lower header drains into a 2-in. drip main not provided with steam traps, and the drip is returned through the feed pumps to the boilers.

GENERATING UNITS

The engine room contains five generating units having a total capacity of 4075 kw, a 500-kw rotary converter and a



GENERAL VIEW OF ENGINE ROOM, LOOKING EAST

engines were used in the old power house of the company and are of tandem compound type, while both generators are General Electric 60-cycle, three-phase machines. An additional 1500-kw turbo-generator will be installed in the station during the coming year. All of the a. c. machines are excited from the 75-kw turbo-generator exciter set previously referred to. The rotary converter is used either as an a. c. or a d. c. machine. After midnight the a. c. machines are usually shut down and the lighting load is car-

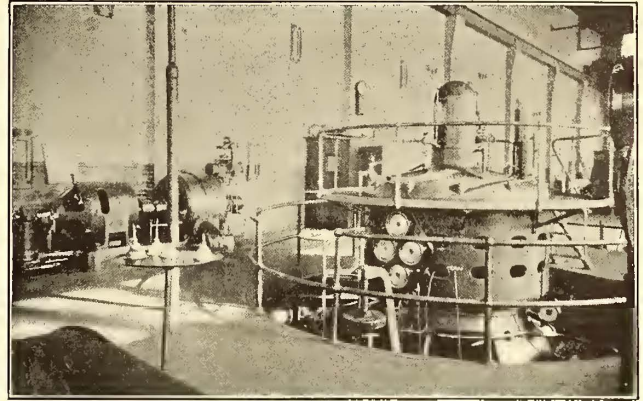
ried through the converter by the railway generators. At other times the rotary converter furnishes power from the a. c. generators to the railway circuits.

The hydraulic accumulator for the turbine step bearing flotation system extends from its foundation in the basement up through a large square opening in the engine room floor. The cylinder is weighted with 12 cu. yds. of sand retained in a cylindrical receptacle 8 ft. 8 ins. in diameter and 7 ft. deep. Pressure is maintained in the accumulator by two Worthington duplex 7½-in. x 2-in. x 6-in. pumps. The engines exhaust either into condensers or into a 24-in. main connected with a city heating plant. The company has a contract with the heating company whereby exhaust steam is furnished to the mains between Oct. 1 and April 15, at a certain price per 1000 lbs. of condensation, the condensation being returned to the station.

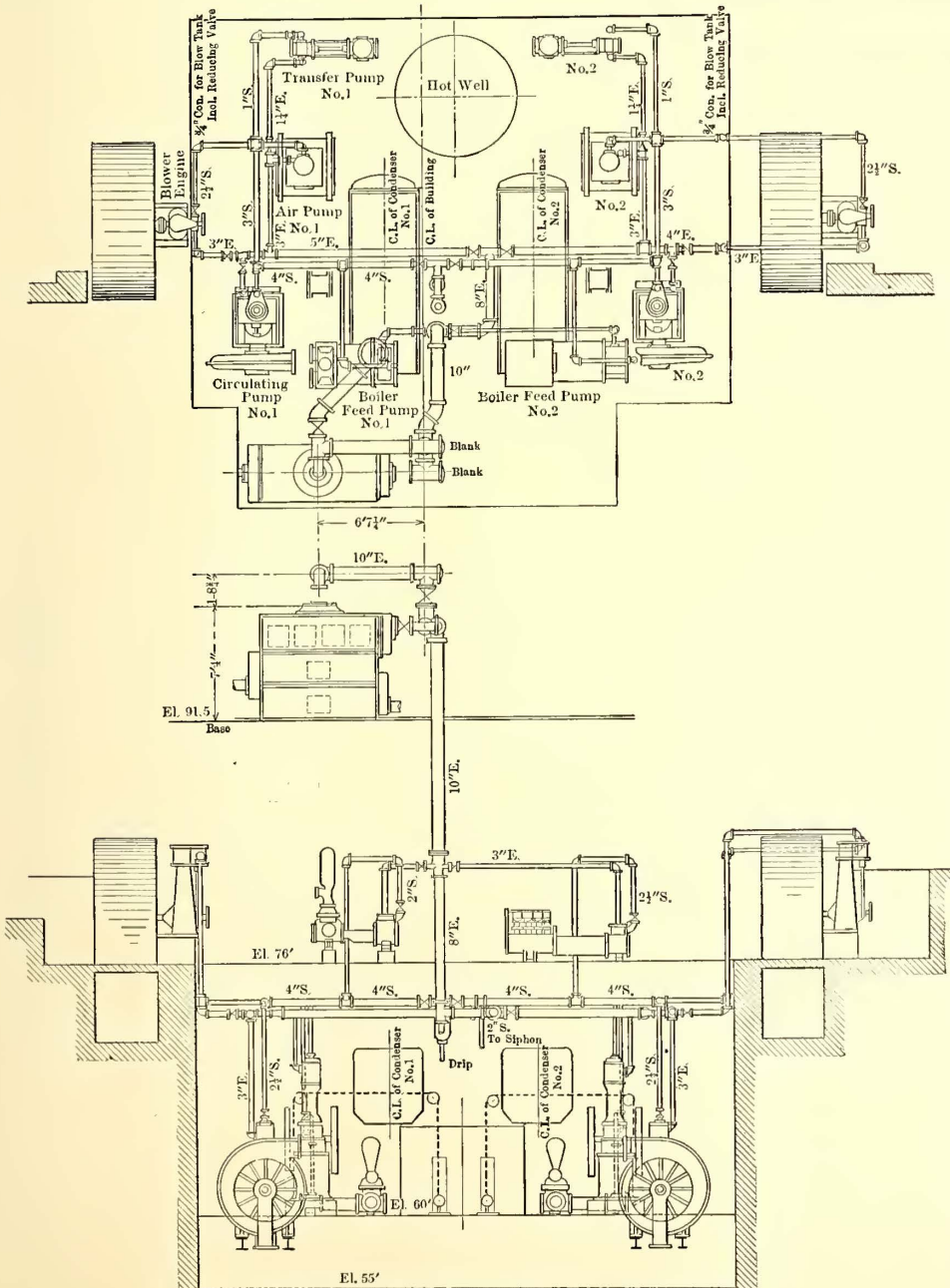
CONDENSERS

Two Wheeler surface condensers, each with 2300 ft. of cooling surface, two independent sets of auxiliary apparatus for them and an 8-ft. x 7-ft. hot well are located in the pit

below the basement floor. The auxiliary apparatus is all steam-driven. That for each condenser consists of a 12-in. volute circulating pump driven by a vertical engine, an Edwards vertical vacuum pump and a Blake single hot-well



TURBINE AND TURBINE EXCITER



AUXILIARY STEAM AND EXHAUST PIPING LAYOUT

pump. The two sets of auxiliary apparatus are so piped that either set may be used with either condenser.

Circulating water is obtained from the adjacent river. Two 24-in. pipes run from the river to a concrete well just north of the boiler room. The well, which is 37 ft. deep, 6 ft. wide and 14 ft. long, contains a concrete partition through the middle dividing it into two sections. Vertical screens, which are raised for cleaning by a windlass above the well, may be placed in either section. From each section of the well a 24-in. cast-iron pipe leads to the condensers and circulating pumps. The piping is so arranged that either of the two pipes and the two portions of the well may be used either for the intake or the discharge. In summer the water in the river reaches a temperature of 87 degs., and partly because of this and partly because of the impurities in the water it is proposed to drill wells for a better supply.

A 5-in. steam main from the upper section of the main steam header branches out to all of the auxiliary apparatus with the exception of the turbine exciter, which machine is supplied with a separate supply main from the header. The exhaust from the auxiliaries is carried through a 10-in. main to a secondary heater in the boiler room and then through a free exhaust extending through the roof of the room. Two primary heaters used when the engines are exhausting into

the city heating system are connected to the exhaust piping of the engines just before the exhaust enters the condensers. Feed water from the hot well is drawn successively through the two primary and the secondary heaters before it enters the boilers. Surplus water for the boilers is ob-

ployed. The engine room is spanned by a 20-ton hand-operated crane.

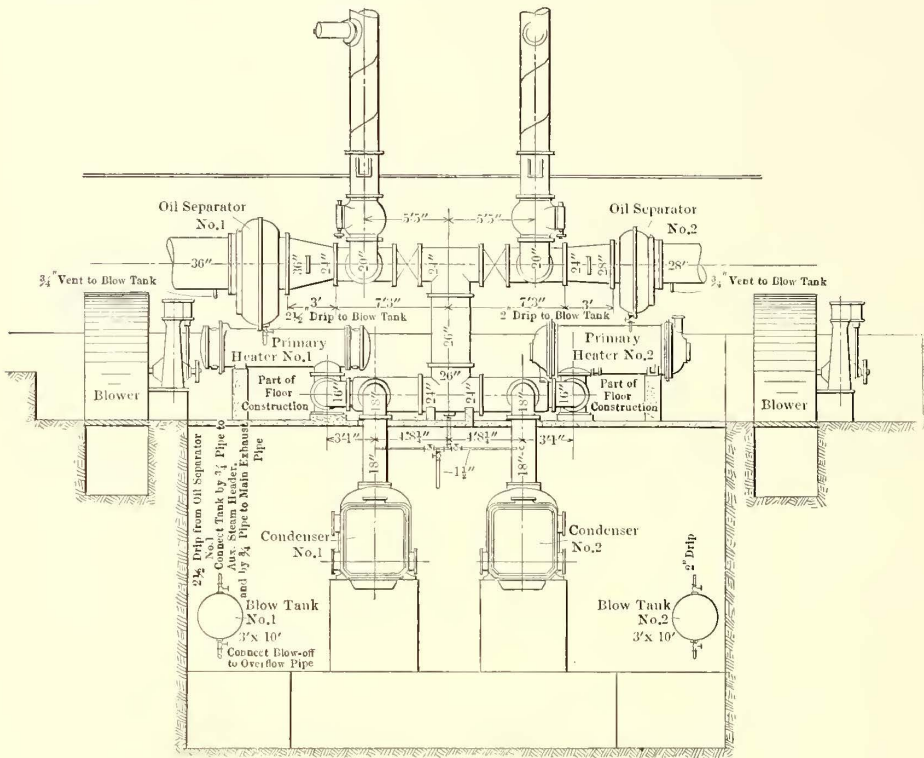
**LIGHTING**

General lighting of the station is effected with arc lamps. Those in the boiler room are suspended from the ceiling. The engine room lamps are hung on iron poles with ornamental brackets. Current for lighting the station is taken from one phase of the motor-generator set.

**SWITCHBOARD**

The switchboard is located 8 ft. from the south wall of the engine room at the center line of the building. The a. c. panels are at one end, the d. c. machine panels in the middle and the railway feeder panels at the other end. All the wiring to the board is carried in iron pipe conduit.

Each railway feeder leaving the station is connected to one lightning arrester located on the back of the switchboard and to a second arrester on a pole outside the building. Near the station the ground return is made up of thirteen parallel 35-lb. T-rails bonded together. Inside the station the negative return consists of about thirty 00 copper wires in parallel. Just outside the building the return is grounded to a copper plate 1/4 in. thick and 4 ft. square, buried under



DETAIL OF EXHAUST SYSTEM

tained from the city system, the river water being too impure to use in the boilers.

**OILING SYSTEMS**

The engines are oiled by two oiling systems, a gravity system for the bearings and a pressure system for the cylinders. The tank for the gravity system is set up against the smokestack near the boiler room roof, and holds 250 gallons. The housings of the engines drain to a filter in the basement. In this the oil is first filtered through waste and gauze and is then forced through 18 ins. of water. Duplex pumps force the oil into the elevated tank. Two pressure tanks located on the boiler room floor are used in connection with the cylinder lubricating system. Each holds one barrel of oil. One can be shut off and filled while the system is feeding from the other. Lukenheimer sight feed lubricators are employed at the cylinders, two lubricators being used in parallel.

**CLEANING WASTE**

Since a centrifugal waste cleaner has been in use the waste bill has been cut about 50 per cent. The machine is piped to the filter in the basement.

**AIR COMPRESSOR AND CRANE**

Dust is blown out of the machines by compressed air obtained from a Westinghouse steam air compressor installed in the engine room. A pressure of 50 lbs. is em-

a 4-ft. bed of coke and about 15 ft. below the surface of the ground.

A bath room in the west end of the engine room basement contains both shower and tub baths.

The station was designed and erected by Ford, Bacon &



A PORTION OF THE SWITCHBOARD AND THE ROTARY CONVERTER

Davis. D. A. Hegarty is general manager of the operating company and R. F. Baise, as chief engineer, has been in charge of the station since its completion. During the time the plant has been in operation, Mr. Baise states, an engine has never been shut down because of a hot bearing.



## RECENT EXPERIENCE WITH CORRUGATED RAILS ON THE BOSTON ELEVATED RAILWAY SYSTEM

BY ARTHUR L. PLIMPTON, C. E.  
Civil Engineer, Boston Elevated Railway Company

It became necessary for the Boston Elevated Railway Company late in the season of 1906 to rebuild in brick pavement a double-track curve, 800 ft. long and about 1300 ft. radius, and one of the worst pieces of noisy corrugated track on the system. The writer felt that here was an opportunity to apply all the known suggestions for preventing a recurrence of the difficulty in the new track.

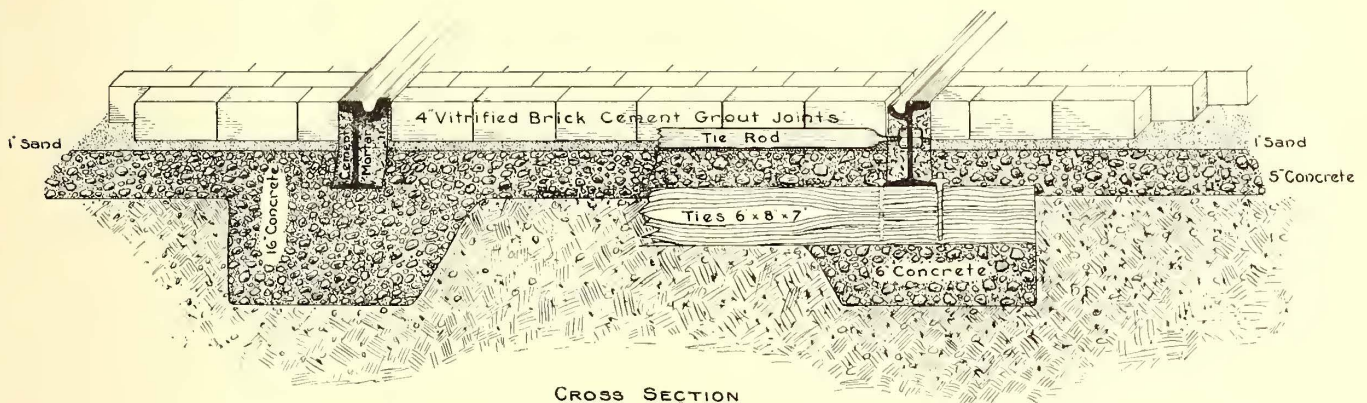
It was necessary, first of all, to build it in such solid manner that it would be practically free from vibration under the action of passing cars, and the cross section herewith shows how this idea was carried out.

Previous experience had shown that although there may be no movement to ties bedded in concrete, there may be considerable rail movement where the rails are merely spiked to the ties with ordinary spikes, so in this case screw

is impossible to correct this difficulty by any method of track construction, and that the difficulty is wholly with the type of trucks now in use. It may be that the only effectual remedy will be to so design the trucks that the wheels will turn independently of each other, and perhaps also that the axles will always be on radial lines. This would introduce such serious mechanical difficulties that it may be that corrugation is a lesser evil, but the writer feels that this is the only direction in which to look for a complete remedy for corrugation.

Others who have studied this problem may not agree with the above conclusion, and the writer would be very glad indeed to have anyone point out in what way, in his opinion, if any, this length of track could have been constructed differently so that no corrugations would have occurred.

Since writing the above, the writer has read the very interesting paper on "Rail Corrugation," by Joseph A. Panton, in the April 13 number of the STREET RAILWAY JOURNAL. Mr. Panton seems to have arrived at the same conclusion as the writer, namely, that the cause of the



CROSS-SECTION OF BOSTON TRACK ON WHICH CORRUGATIONS OCCURRED

spikes were used, which have much greater holding power. The concrete was allowed to set ten days before the first car was operated over it.

As one cause of corrugated rail is considered to be the constant tendency of the wheels to climb up over the outside rail of the curve, it was determined to use a guard rail on the inside and to build the track wide gage so that the wheels would not touch the gage line of the outside rail, the car being guided wholly by the guard of the inside rail. In addition to this the outside rail was elevated above the inner one on each track. The theory that the cause of corrugation is the chattering of the rollers in the process of making the rails and that the corrugations really exist before a car has been run over the rails, can hardly be reconciled with the fact that the lengths of the corrugation waves vary apparently with the speed of the cars.

Everything aimed at was successfully accomplished, and the writer hoped that here was one curve that would be free from the difficulty. During the winter there was but little opportunity to examine this track, but recent reports having called attention to it, a careful examination was made and it was found that after an interval of only five months it showed distinct marks of corrugation throughout, and, under the heavy travel that it receives, there is no doubt that before very long it will be a badly corrugated track again.

The writer has, therefore, come to the conclusion that it

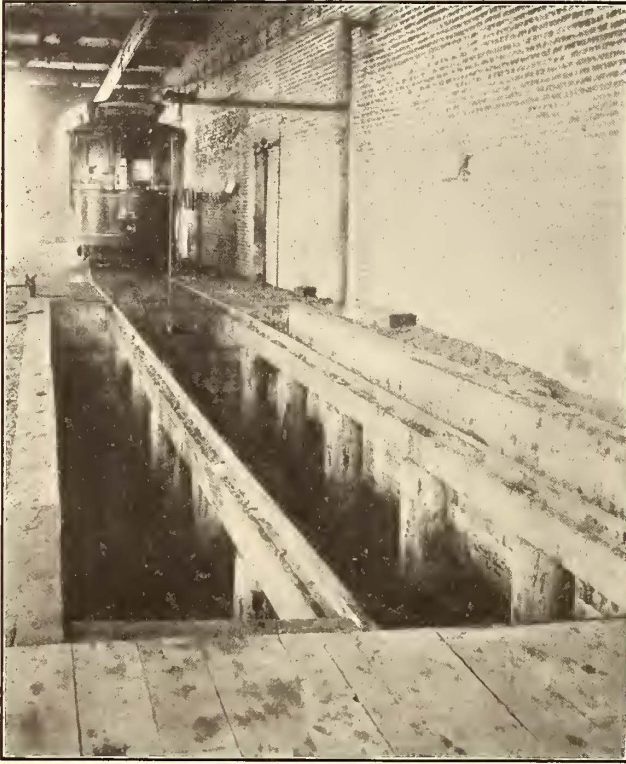
trouble lies in the faulty construction of the trucks and not that of the tracks.

## ELECTRIFICATION OF THE CASCADE TUNNEL

It is stated that a contract has been placed by the Great Northern Railroad with the General Electric Company for four 100-ton, three-phase locomotives, each to be equipped with four motors, to be used on the Cascade tunnel. These locomotives, which will be geared, will take current from an overhead system at 6000 volts. They are to be designed for single speed with resistance control. A site for a power house has been located about 25 miles from the tunnel, where the conditions are such that adequate power is available. Here the construction of a 2-mile flume will afford a head of 140 ft. In this connection it is of interest to note that the tunnel is 14,400 ft. long and that the grade is 1.9 per cent, one end being 240 ft. higher than the other. The portion to be electrically equipped at present is merely the tunnel, which is near the summit of the section. If successful, the entire section, 60 miles in length, will be equipped with electric power. The section consists of approximately 30 miles of ascending and 30 miles of descending grade, and, if the electrical system is so extended, recuperation will be used. Dr. Cary T. Hutchinson is electrical engineer for the railway equipment.

### OKLAHOMA CITY RAILWAY NOTES

The railway system of Oklahoma City has had a growth almost as phenomenal as that of the city in which it is located. Since its charter was obtained, Jan. 28, 1903, it has grown to a system having 20 miles of track and oper-



VIEW OF THE EXTRA WIDE PIT

ating thirty-five cars. Development is still continuing at a rapid rate and plans are being formed for making the city lines a portion of an extensive interurban system with lines radiating in several directions from Oklahoma City to neighboring towns.

The fact that the system is located in a district out of the regions where conventions and business relations throw electric railway men together frequently is no doubt responsible for the development of several quite original features of practice.

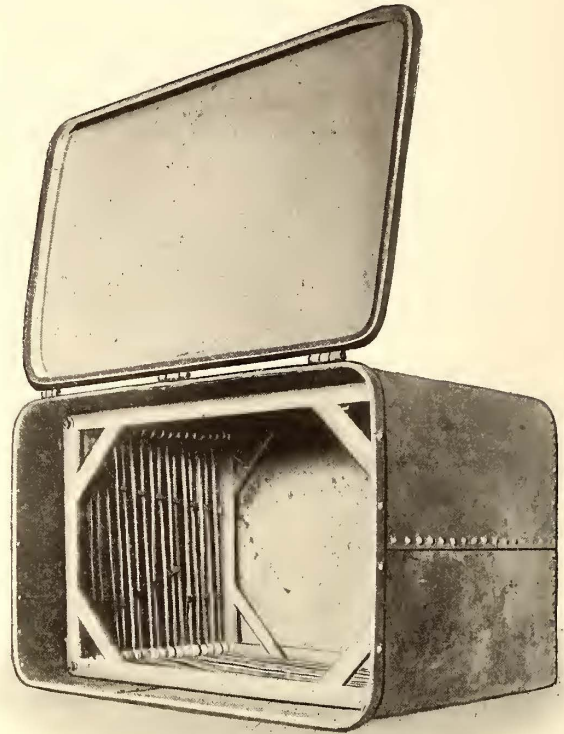
#### SHOP NOTES

A new car house recently constructed is practically fireproof. The roof is of concrete construction, the walls of brick and the doors are covered with sheet iron. An accompanying illustration shows the type of door fastener used. The doors are held together at two points. The illustration also shows a good scheme for holding the doors open.

The pits as originally constructed in the building extended only between the rails. They have been widened, as shown in the illustration, which type of pit is found more satisfactory.

The armature oven used in the shop consists of a box made of No. 14 sheet iron measuring  $3\frac{1}{2}$  ft. wide by 5 ft. long by about 4 ft. deep. The coils are wound on porcelain insulators supported on a wood frame. A temperature of 200 degs. is obtained in about three hours.

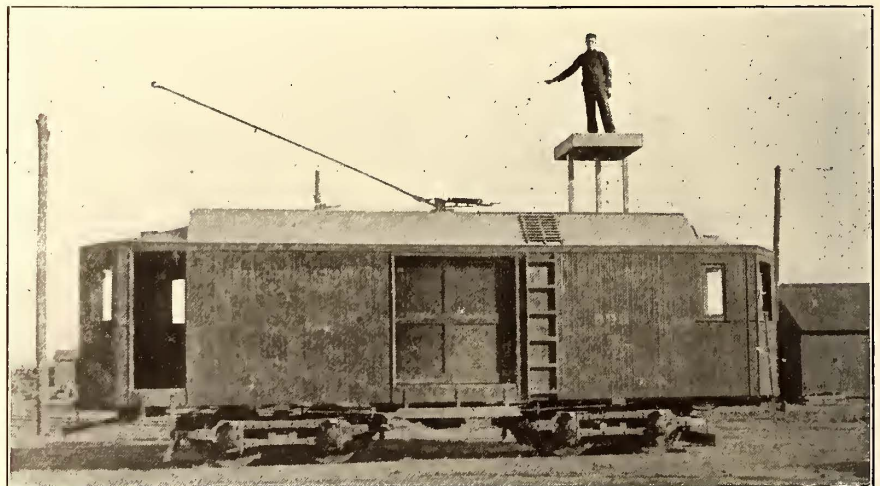
The machine shop is well provided with tools, including a 37-in. boring machine and a 26-in. shaper. The wood-working room contains a planer, mortiser, saws and other tools required in car building. For operating air hoists



ARMATURE OVEN

and pit jacks a compressor with a capacity of 160 cu. ft. per minute has been installed.

It is the intention of the company to manufacture all of



LINE CAR BUILT BY THE OKLAHOMA COMPANY

its cars. A work and line car recently constructed in the shops is shown in an accompanying illustration. The tower is elevated by a windlass on the inside. The roof over the body consists of a flat portion on top, on either side of which are two sloping portions. The shops are in charge of Charles W. Day, master mechanic.

#### WHEEL PRACTICE

A 450-lb. chilled wheel with a  $2\frac{1}{2}$ -in. head and a  $\frac{3}{4}$ -in.

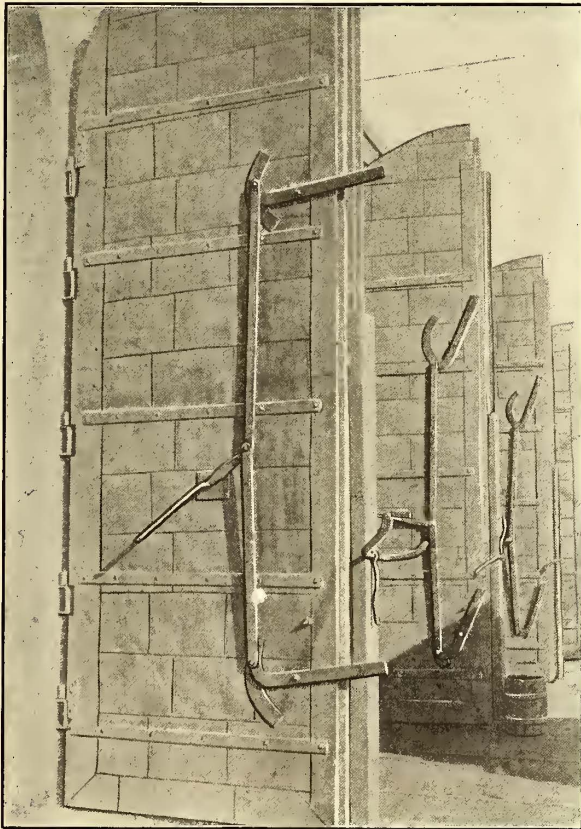
flange is employed. New wheels will have a  $2\frac{3}{4}$ -in. head and a  $\frac{7}{8}$ -in. flange. A soft gray iron brake-shoe made in Guthrie is used.

#### OILING TRACK

Instead of greasing curves they are oiled with "residuum" oil obtained at 9 cents per gallon. Two men are engaged continuously in oiling the track and cleaning switches, and these get over the track two or three times each day. A special oil can holding about three gallons and provided with a valve for shutting the oil off is used. A special tip on the spout of the can fits up against the rail so as to throw the oil against the side of the head of the rail.

#### POLES AND TIES

In city construction a treated pine pole 30 ft. long and with an 8-in. top is used. These are obtained from the Zinc Oil Pole Company, of Texarkana, Tex., and are guar-



DOOR FASTENERS AT OKLAHOMA CITY

anteed for twenty years. Poles that have been in use for three years show absolutely no signs of decay. The main reason for the adoption of the treated pine pole is that it is cheaper than cedar. All the ties used in city construction are of treated pine.

#### TREATMENT OF TRAINMEN

The company believes in the motormen and conductors knowing something in addition to how to run a car, and has supplied a club room adjacent to the shops with technical books and papers. In connection with the club quarters is a bath room for the use of employees.

The company's men have never struck nor have ever made demands for increased wages, yet in four years' time four voluntary increases in wages have been given to them. At present they receive for the first year 17 cents, second year  $18\frac{1}{2}$  cents, and after two years 20 cents per hour. In signing an application blank a trainman promises to abstain from intoxicating liquors while in uniform and while wear-

ing the company's badge. He also binds himself to be liable for damages resulting through his carelessness. After his references have been investigated favorably he is sent to a physician, who examines him and collects his fee from him. If he passes the examination he is put on a car for instruction for about ten days, during which time he receives no pay. The claim agent then instructs him how to make out accident reports and concerning getting the names of witnesses, and cautions him against discussing accidents. In regard to accident reports he is given to understand that the company wants facts and not opinions. Instruction from the master mechanic with regard to cutting out motors and caring for derangements of the equipment, and a talk with the general superintendent, Charles W. Ford, completes his instruction. Mr. Ford impresses the new trainmen with the fact that the company will be lenient with a man who displays bad judgment or makes errors, but that it will not stand for untruths in reports.

### ROUTEING ORDERS AND FREIGHT TRAFFIC IN INDIANA

Several interurban roads in Indiana have increased their freight considerably by the use of routeing orders, instructing shippers to route goods by way of the interurban lines whenever possible. These orders are distributed for filling in the blanks and for signature to merchants and dealers in the towns along the line and are then collected and sent by the railway company to the shippers. The congestion of freight traffic on steam roads has resulted in considerable freight being thrown over to the electric lines, which usually

#### THE FORT WAYNE & SPRINGFIELD RAILWAY COMPANY

Traffic Department

Routeing Order

.....Ind.....190.....  
 To.....  
 Street Address .....  
 Town .....  
 Until further orders, please ship all of our freight via and in care of  
 The Fort Wayne & Springfield Railway Company.  
 .....  
 Yours truly,

The Fort Wayne & Springfield Railway Company handles shipments to and from all points on its lines and connecting traction lines at same rates as in effect via steam routes. Specify The Fort Wayne & Springfield Railway Company when you place your orders, and thus get express delivery at freight rates. Freight train leaves Decatur daily at 9 a. m.; Fort Wayne at 1:30 p. m. Arrives at Fort Wayne 10:30 a. m.; Decatur, 3 p. m.

make quicker deliveries, although the route is indirect. Shipments from Marion, Ind., to Decatur, Ind., a distance of 46 miles, when sent by steam roads are sometimes four or five days en route. When shipped by interurban lines by way of Wabash and Fort Wayne, deliveries are made on the day of shipment, although the distance is almost three times as great as the steam-road route and the goods have to be transferred from one car to another at Fort Wayne.

The lottery of the Mexico Electric Tramways, Ltd., which for the past two years has been a prominent feature of its ticket department, was abolished on May 1. The last drawing took place April 1. According to R. C. Brown, managing director of the company, who is at present acting as general manager, the ticket department from May 1 will be conducted on a strictly business basis, and there will be no further annoyances from lottery drawings.

## NOTES ON SINGLE-PHASE ELECTRIC TRACTION

The complete report of the meeting of the British Institution of Civil Engineers, on Nov. 13 to 20, 1906, containing the paper on single-phase electric traction, by C. J. Jenkin, and the resultant discussion, has just been received. It contains a number of interesting points which have not been made public elsewhere.

In describing the magnets for single-phase contactors, the author presents drawings of a self-regulating single-phase contactor magnet designed to give a considerable pull over a long range. To overcome the effect of vibration or chattering when the magnet is closed, a small short-circuit ring is fitted over part of the armature and provides the desired "hold-on force." Referring to lighting, the author believes satisfactory results can be secured by the use of thick filament low-voltage lamps, even when the frequency is as low as sixteen cycles per second, and publishes the following table:

LOW-PERIODICITY LAMPS.

Cycles per Second	Voltage	Three Observers' Notes		
		a	b	c
	Volts			
16	100	Unpleasant	Distinctly noticeable	Noticeable
16	50	Distinctly noticeable	Noticeable	Satisfactory
16	35	Noticeable	Satisfactory (limit)	"
16	24	Satisfactory	"	"
16	15	"	"	"
25	24	"	"	"
25	15	"	"	"

Interferences with neighboring telegraph and telephone circuits from the current in the power circuit of a single-phase railway are due, according to Mr. Jenkin, to (1) earth currents from the rails, (2) electromagnetic induction from the trolley wire and rails, and (3) electrostatic induction. The first can be overcome by the use of an insulated metallic return for the telegraph and telephone circuits, and, as the effect is proportionate to the drop of voltage in the rail return, it can be reduced by choosing a high trolley voltage and low frequency. The effects of electromagnetic induction can be avoided in telegraph circuits by using a twisted metallic circuit. It can also be reduced either by using a copper sheath on the electromagnet of the telegraph instrument as a dampener or by shunting the telegraph instrument by a condenser. In telephone circuits it is desirable to put the wires in cables to avoid electromagnetic induction. To reduce electrostatic induction the telegraph and telephone circuits must be earthed, as while their capacity is small, the induction from the single-phase line is sufficient to create trouble. A metallic return does no good in the case of static induction; on the contrary, the author says, it doubles the capacity of the circuit. Telephone circuits may be earthed at the middle point of a choke coil connected across the terminals of the instrument. The low-frequency induced currents will then flow through the choking-coil to earth, while the higher-frequency telephonic currents will not be short-circuited. This method has been successfully used in Sweden. The author suggests that to reduce electrostatic induction on telegraph circuits they may be earthed at one or more points through high resistances, which will shunt very little of the telegraph currents, but will keep the voltage of the wire within safe limits; but does not know if this method has been used. Static induction may be avoided also by putting the wires under ground.

The author describes all of the well-known catenary

forms, but considers by far the best that of the double catenary, in which the working conductor is suspended by droppers from a horizontal cable. This construction is used on the Blankenese-Ohlsdorf road, and was described in the STREET RAILWAY JOURNAL for April 6, 1907. In this form, if the catenary is given a fairly large sag, the change of level of its center point can be kept small for any probable range of temperature. In a 150-ft. span, with 50 ins. sag and 50 degs. C. range, the motion was found to be only 2.28 ins. The variation of length of the trolley wire can be taken up in several ways. On curves the elasticity of the poles and of the construction generally will be sufficient. On straight stretches the trolley wire may be tightened endways at intervals by means of weights and chains over pulleys, as is done on the Blankenese line. As a fall of 50 degs. C. will produce a tension of about  $7\frac{1}{4}$  tons per square inch, a figure just beyond the elastic limit of hard-drawn copper wire, a device of this kind, which allows the tension to be kept constant, is advantageous.

Where the wire passes close beneath any iron structure, such as the girders of a bridge, an arc shield should be used to prevent any arc between the bow and trolley wire from rising and earthing the circuit. For this purpose an iron plate is desirable, and, of course, should not be earthed. Experiments which the author has made show that smoke and steam will not seriously increase the sparking distance from the trolley wire; but flame, such as often issues from a locomotive funnel, is a much better conductor.

In speaking of collectors, he refers to the necessity on high-speed roads of keeping the mass and consequently the inertia of the collector as small as possible. He believes that where the pantograph is used, the best results at high speed will be secured when a jointed collector, consisting of one or more light bows hinged on to the main frame, are employed. By using three springs in series, the effective inertia of the Zossen collector gear was reduced to 1 1-3 lbs.

### DISCUSSION

A. P. Trotter referred to some experiments at Leeds, which indicated that electrolytic action could be produced by an earthed single-phase current. He did not consider the elaborate device for taking up the tension of the trolley wire, described in connection with the Blankenese road, to be necessary.

Major P. Cardew discussed the subject of electrolysis to a greater extent, and explained it by the fact that when a wave of negative electricity charged the trolley wire, the negative electricity attracted any moisture there might be, and the leaks temporarily became increased. At that instant the positive electricity was trying to charge the rails, but the total amount of charge being very small, unless there was a bad leak on the trolley wire, it could not polarize the rails to such an extent as to prevent the escape of the electricity to earth. In the next half cycle the trolley wire was positively charged, all the moisture was repelled, and the leakage became much smaller; and, of course, the corresponding negative electricity leaked from the rails. The general result was a continuous passage of negative electricity to earth from the trolley wires and of positive electricity to earth from the rails, and he thought it was that current which produced the electrolytic effects.

W. M. Mordey said that on the Oerlikon experimental road, where 15 cycles are used, a great deal of telephone disturbance has been traced not so much to the direct effect of the current, but to high-frequency alternations superimposed on the main wave and caused by the commutator

bars passing under the brushes, acting to produce a micro-phonous effect. He also discussed the question of motor heating, and referred to a new alloy of iron and silicon which had recently been discovered by Mr. Hadfield and Prof. Barrett, which would reduce the hysteresis loss, and, having a very high specific resistance, it had also much less eddy-current loss. Taking two examples, both at a magnetic flux density of 10,000 C. G. S. units and 50 cycles per second, the first example showed that with the new material the lamination need not be so fine. The total loss in a given weight of 0.048-in. sheets of the new material would be the same as with the same weight of 0.014-in. sheets of good magnetic iron. Again, with a given weight of 0.024-in. plates of "Stalloy," as the new material had been called, the loss of energy would be about 1 watt per pound instead of about 2 watts per pound with the best magnetic iron.

A. C. Kelly referred to the alternating-current contactor magnet mentioned by the author, and believed that the maximum pull given for this magnet (116 lbs.) was too small if the contactor was to handle large currents. Tests of contactor contacts indicated that the temperature of the contacts under a given current rose rapidly with decreasing contact pressure. For example, a contact 1 sq. in. in area, carrying 600 amps. continuously, had a temperature rise of about 62 degs. F., with a pressure on the contact of 350 lbs. With a pressure of 100 lbs. on the same contact the temperature rise was found to be about 130 degs. F. He thought pneumatic pressure preferable to the direct action of a. c. magnets.

Edgar C. Thrupp, arguing in favor of separate power stations, said that it was rarely advantageous to install a sub-station of as high as 1500-kw capacity. He had recently made an elaborate study of the statistics of power stations, with a view of obtaining a correct comparative estimate of the cost of working stations of various sizes, and he had arrived at a simple, broad conclusion as regarded fuel consumption. He found that with a load factor of about 15 per cent, the fuel consumption per unit generated was, roughly, inversely proportional to the logarithm of the maximum load in kilowatts. There was, of course, a variation with the load factor as well, and the improvement in fuel economy with an increase of load factor was much more rapid with small powers than with large powers. Consequently, there was less to be gained in this respect by large power stations for railway purposes than for electric lighting.

### THE BERKSHIRE HILLS BY TROLLEY

"The Berkshire Hills by Trolley" is the title of a booklet published by Lyons & Gerst, of Pittsfield, Mass., which gives not only the routes of the trolley lines traversing the beautiful Berkshire Hills, but also the automobile routes. The lines are all given with Pittsfield as the center, together with the distance and fare. In this way trips are explained to such places as Lenox, Lee, Stockbridge, Great Barrington, Cheshire, Adams, North Adams, Williamstown and other points. There are also maps showing the lines of the Pittsfield Electric Street Railway Company and the Berkshire Street Railway. In addition, there are any number of illustrations which show the character of the country through which the lines extend. The book is a good example of the attractive kind of literature which can be prepared to advertise trolley routes.

### ELECTRIFICATION PLANS FOR ITALIAN STEAM RAILROADS

The Italian Parliament has recently granted 50,000,000 liras (\$10,000,000) for electrifying the following trunk line divisions of the State Railways:

1, Pontedecimo-Busalla, 11 km; 2, Savona-S. Giuseppe, 21 km; 3, Bardonecchia-Modane, 7 km; 4, Mailand-Monza-Lecco, 51 km; 5, Usmate-Bergamo, 26 km; 6, Calozio-Ponte San Pietro, 18 km; 7, Gallarate-Arona, 26 km; 8, Gallarate-Laveno, 32 km; 9, Domodossola-Iselle, 19 km; 10, Pistoia-Porreta, 40 km; 11, Neapel-Torre Annunziata-Salerno, 54 km; and 12, Torre Annunziata-Castellammare, 6 km. This makes a total of 311 km, or about 193 miles. This work is to begin not later than the end of 1911.

Lines Nos. 1 and 2, respectively, are portions of the Genoa-Milan and Savona-Turin trunk lines, while No. 3 is a portion of the Turin-Paris line, of which the Mount Cenis tunnel forms a part. Line 4 is an extension of the Valtellina Railway (Chiavenna-Sondrio-Colico-Lecco) to Milan, and lines Nos. 5 and 6 are branches of the Valtellina Railway covering the connections between Milan and Bergamo and between Lecco and Bergamo. Lines 7 and 8 are branches of the electrically operated trunk line between Milan, Gallarate, Varese and Portoceresio, serving the local traffic between Milan and Lake Maggiore. Line No. 9 is a part of the Milan-Lucerne, Italy-Switzerland Railway, and represents an extension of the electrical operation of the Simplon tunnel. Line No. 10 is a portion of the trunk line between Milan, Florence and Rome. Lines Nos. 11 and 12 form the connection between Naples and the Sorrentine peninsula, which is a very popular pleasure resort for the greater part of the year.

It is understood that lines Nos. 4, 5 and 6, which are part of the Valtellina Railway, and line No. 9, forming the Simplon tunnel extension, will be operated by three-phase current; but lines Nos. 7 and 8, which are branches of the Milan-Portoceresio line, will use the direct-current third-rail system already installed on the portions of this line previously electrified. Three-phase operation has been definitely decided for line No. 1, and the contract is now in the hands of the Westinghouse Company. As is well known, the electrical experts of the Italian State Railways are favorably disposed toward three-phase operation, and it is, therefore, considered very likely that this method will also be used for lines Nos. 2, 3 and 10, but it is possible that lines Nos. 11 and 12 may be equipped for single-phase current.

The sections mentioned under Nos. 1, 2, 3 and 10 are comparatively short branches of the trunk lines to which they belong, but they have especially severe operating conditions. They are all mountain divisions with numerous curves, severe grades, and, in part, with very long tunnels. Owing to the constantly increasing train weights required to carry the business, the steam locomotives are no longer capable of making schedules. This condition has led to numerous delays, especially as most of these divisions are single-track. Another reason for electrification is the smoke nuisance in the tunnels, which in many cases badly hinders operation. This is particularly true of the Mount Cenis tunnel, where the trainmen are frequently made ill by continued subjection to the tunnel gases.

Electrification was also considered desirable for the lines running from the harbors of Genoa and Savona, as they carry the greater portion of industrial material, including fuel used in the heavily populated districts of Northern Italy,

besides doing a large through business to other countries. The rapid development of the Northern Italian industries and the necessity of making the lines able to handle the increased business brought up the subject of electrification to permit higher speeds and heavier train loads. In fact, the freight service has fallen so far behind that numerous factories in Piedmont and Lombardy have been forced to suspend operations in whole or part because they could not get sufficient coal. The necessary electrical power could not be secured to continue work owing to droughts which seriously affected the water-power plants in these districts.

Some idea of the kind of trains and schedules which the government operates on the electrified lines may be obtained from the proposed program for the Ponte Decimo-Busalla division. Up-grade trains are to consist of eighteen loaded cars weighing in all 324 tons, but may be increased to twenty-one cars, equal to a weight of 380 tons, loaded. The maximum train load down-grade may be composed of fifty-four cars. The average weight of a loaded car is placed at 18 tons, and without load,  $7\frac{1}{2}$  tons. The freight trains are to run at an average speed of 45 km an hour. The latter will also be the speed of the few passenger trains operated on this section, as this line really is a freight division, since the more important passenger trains are operated on a parallel line through the Ronco tunnel. The freight trains will be operated by two locomotives, one at the head and the other at the end of the train. The service weight of these trains will vary between 70 and 75 tons, distributed on five axles, all of which are drivers. The highest permissible weight per axle is 17 tons. At first, the up-grade trains will run on a 15-minutes' schedule, but later on 10-minutes' schedule, to enable which the line will be divided into three blocks. The down-grade trains will run at half-hour intervals. Under normal conditions the trains will be operated eighteen hours a day.

Power for this line will be generated in a 7500-kw steam turbine station at Genoa, and will be distributed from three sub-stations furnished with stationary transformers. The primary circuit between the power house and the first sub-station has a length of about 15 km, and between the first and the last station, 12 km. The size of the middle sub-station is to be such that operation of the line could be continued should the third or Busalla sub-station be out of service.

### NEW ENGLAND TROLLEY ADVERTISING

The Passenger Department of the Boston & Northern and Old Colony Street Railways has in preparation some trolley literature for this season that will be entirely a new departure, distinctly different from anything previously issued by these companies. The main feature of the folder will be a large map of the entire eastern section of Massachusetts east of Worcester, Southern New Hampshire and the larger part of Rhode Island attractively gotten up in four colors. The lines of the Boston & Northern Street Railway Company and Old Colony Street Railway Company, and the lines of every other street railway company operating in this district as well, will be shown, and all of the principal cities and towns, lakes and rivers, parks and groves, seashore resorts and other places of interest not shown on other maps will be given. On the back of the map will appear the schedules of the two companies, arranged as concisely, and with a view to giving the trolley rider the most vital information, as possible. After

being folded, what will appear as the covers of the folders will be very artistic designs printed in colors. The folders of the two companies will be distinctly different, except for the large map of the entire district appearing in both.

### BONUS SCHEME FOR ENGLISH MOTORMEN

The Tramways Committee, of West Ham, England, has approved a bonus scheme drawn up by Manager H. E. Blain for motormen and conductors, for general efficiency, punctuality and good conduct. There is further to be a bonus for motormen in connection with energy consumption. This is to be paid at the end of each financial year in which a reduction in the energy consumed per car-mile has been effected in comparison with the previous year. Five per cent of the sum represented by and saving of energy is to be divided among all motormen in the service at the end of each year who have been employed for not less than six months in each year.

### COMPARISON OF THIRD RAIL AND OVERHEAD TROLLEY CONSTRUCTION AS APPLIED TO THE ELECTRIFICATION OF STEAM ROADS

Many comparisons of the relative advantages and disadvantages of distributing systems have been published, but practically all of them have been mere recitals of the different merits of each method. The subject, however, is taken up in a quantitative way by C. E. Eveleth in a recent issue of the "General Electric Company Review," and an attempt is made to give demerit weights to the different factors or conditions involved in each system. The three columns herewith represent, respectively, (1) the four-track protected third rail for heavy traffic; (2) the overhead high-tension three or four-track bridge catenary construction with 300-ft. spans for heavy traffic; and (3) the high-tension catenary pole construction of the side bracket or cross-span type for light traffic or single cars. No attempt was made to list the advantages of the electric systems over the steam systems, nor has a balance been made of the relative costs of the electric systems, questions which should be considered separately. Numbers have been placed after every item, which may, for convenience, be said to represent units of difficulty.

The totals of these three columns give the following interesting results:

1. Third rail (protected).....	14
2. Overhead high-tension bridge construction.....	50
3. Overhead high-tension side bracket or span construction.....	27

These figures are not based on any absolute figures, but indicate, to a certain extent, the relative difficulties of the systems, as viewed by the author.

In round numbers, the costs per mile of single-track collectors installed for the various constructions are about as follows:

1. Third rail (protected).....	\$5,500.00
2. Overhead high-tension bridge construction.....	7,000.00
3. Overhead high-tension side bracket or span construction.....	3,500.00

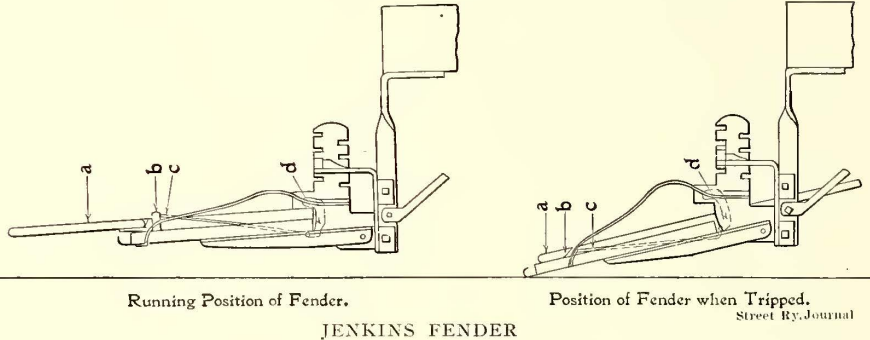
The author states these values indicate that in many instances the increased difficulties encountered with system No. 3, as compared with No. 1, may be more than offset by their relative costs. It would also appear that there must be other reasons than those of economy and freedom from difficulty in operation on the particular section of a road where system No. 2 is used.

RELATIVE DISADVANTAGES

I Protected Third Rail.	II Overhead High Tension Bridge, Catenary Construction.	III Overhead Side Bracket, Catenary Construction.
A. Interference with track maintenance... 3	Entirely clear of road bed..... 0	Same as II..... 0
B. Can be maintained by section gang... 1	Requires special tools, crews and work trains..... 5	Same as II, but not as important..... 2
C. Easily cleared up and insulated when derailment occurs..... 1	In the way of boom of derrick car—liable to be knocked down and put all tracks out of service..... 3	Same as II..... 3
D. Hindrance to coupling freights, etc. With protected rail this is not very serious..... 2	Dangerous to freight brakemen on account of parts hanging down and small bridge clearance. Very difficult to install satisfactory ticklers to warn trainmen when approaching bridges..... 4	This point is of less importance..... 1
E. Interference with clearing snow between tracks..... 1	Not affected..... 0	Not affected..... 0
F. Ease of satisfactorily collecting current on account of location, where relative motion between track and rail is small. Collectors may be safely replaced on the road..... 1	Difficult to collect current, as a more complicated mechanism is required on account of the grade of the wire due to low clearances at bridges and high clearances at road crossings..... 5	Similar to II..... 3
G. May be readily inspected by track walker..... 1	Requires a man with special training... Life of conductor and cables comparatively short on account of wear and deterioration due to gases from freight locomotives and work trains. Should estimate that the entire railroad will be out of commission two or three per cent of the time after the first five years..... 4	Similar to II, but of less importance... 1
H. Life of conductor long..... 0	Life of conductor and cables comparatively short on account of wear and deterioration due to gases from freight locomotives and work trains. Should estimate that the entire railroad will be out of commission two or three per cent of the time after the first five years..... 4	Life of conductor reasonable..... 2
I. Ease of sectionalization. Jumpers may be disconnected at the nearest adjacent road crossings..... 1	Difficult of sectionalization..... 3	Sectionalization not of so much importance..... 1
J. May be worked on while alive to make track changes or repairs, making system very flexible..... 1	Requires that current be shut off no matter how slight repairs are, making system inflexible..... 5	Similar to II, but not of such importance 3
K. Work trains can run out on power from the rail..... 0	Must have independent source of power, such as gas or steam..... 2	Same as II..... 2
L. No interference with visual signals.... 0	Signals located and seen with difficulty, as they must be lower than the bridges and even then have the distant bridges as a background. Dangerous to maintain signals in this location, as it must be done from ladders..... 5	Not affected..... 0
M. Danger of wreck from burning off track rail due to arcing current. This is a possible contingency, but one not very likely to occur..... 1	Danger from dangling overhead work when messenger cable is burned off at a defective insulator..... 1	Same as II..... 1
N. Little interference with fire extinguishing apparatus in the car storage yard 0	Difficulty in removing cars on account of high tension interfering with firemen.. 1	Probably will have low tension for this work..... 0
O. Absolute freedom from lightning disturbances..... 0	Very much exposed to lightning..... 2	Same as II..... 2
P. Entire freedom from telephone and telegraph disturbances, also inductive effects on signal wires..... 0	Difficult, as yet unsolved problem in connection with these interferences, affecting not only the railroad company's wires, but those belonging to other interests. "Unsolved" should be interpreted to mean at moderate expense... 2	Same as II..... 2
Q. No trouble at grade crossings with crossing trolley wires..... 0	Probably trolley crossings will have to be avoided by overhead or undergrade crossings..... 2	Troubles similar to II..... 3
R. Can add sidings or more tracks with little difficulty..... 1	Can make such additions only at considerable expense..... 3	Difficulty not very great..... 1

**FENDER TESTS IN TORONTO**

Two series of tests on a considerable number of different types of fenders have recently been conducted in Toronto by the Ontario Railway and Municipal Board. This board was appointed by the Ontario Government under what is known as the Ontario Railway Act of 1906, and a firm of engineers representing the board had charge and supervision of them. The first tests were made on Nov.



28 and 29, 1906, and subsequently those fenders which were not ready for trial on that date were tested on Jan. 15 and 16. The result of these tests was that the board recommended the Jenkins automatic fender for adoption in the city of Toronto, and notified the Toronto Railway Company of its approval of the use of this fender. At the same time the board reserved the right to recall approval of fenders or wheel guards at any time should they prove inefficient or be replaced by something better in design and operation. The experts also expressed the opinion that certain improvements would be made in several of the fenders tested by them, and that before long they expected to be in a position to recommend, for the approval of the board, at least two more automatic feeders.

The Toronto Railway Company has been using and has at the present time on its cars some five or six hundred semi-automatic fenders of the Watson type, known as the twentieth century fender. This fender was considered by the board in its report to have especial merit as a semi-automatic fender, but this principle was not considered as desirable as the purely automatic. The accompanying engraving will give an idea of the twentieth century design. It is of the trip type, that is, it can be dropped by the motorman with his foot by means of a short lever. This fender has given very satisfactory service since it was placed on the Toronto cars, and has been improved from time to time. It folds up into a very small space, is light in weight, is not very expensive to maintain, and is manufactured by the company. Nevertheless, as the trend of public opinion and the report of the board were in favor of a purely automatic fender, which will operate without the action of the motorman, and as it has always been the policy of the Toronto Company to give a fair trial to any reasonable suggestions which promise improvement to its service, the company has decided to equip a number of cars with the Jenkins fender, and has started to manufacture

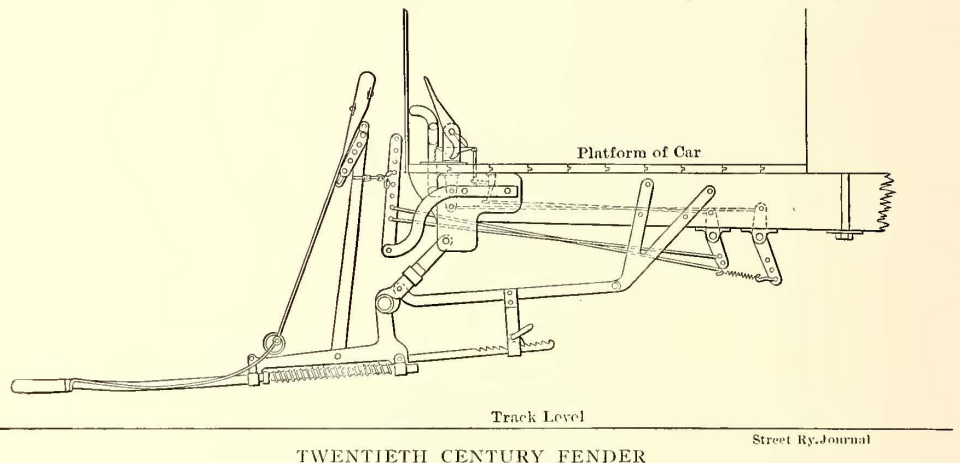
them on a large scale in its own shops. In fact, this right was secured by the company during the early part of 1906, before the Ontario Railway Board was appointed.

Up to the present time the company has equipped with the Jenkins fender about sixty new cars, which were placed in service at the first of the year, and will soon put about one hundred of them in use, so as to give the new fender a thorough practical test.

The Jenkins fender is released by a loose trip-bar and trigger catch, the drop being accelerated by springs. It folds up when not in use, and the buffer and fender proper can both be easily detached separately, to allow cars to be coupled together. The fender is partly suspended from the truck in order to reduce the effect of the car oscillating on single trucks. In the accompanying engraving, *a* is the feeler bar, *d* the gravity hook, and *c* is

a rod connecting *d* with a clevis *b*. The drawing does not show a wire guard, 6 ft. or 7 ft. in length, which goes with the fender, and is attached to the side of the car just back of the fender brace, to prevent a body from rolling under the car wheels from the side.

The Toronto Company is still maintaining its twentieth



century fender on those cars which are now fitted with it, but probably all new cars which the company will put in service in the near future will be equipped with the Jenkins type of fender.

**AN ALTERNATING CURRENT POWER STATION AND SUB-STATION FOR THE BROOKLYN & CONEY ISLAND RAILROAD COMPANY**

The Brooklyn & Coney Island Railroad Company is planning to make radical improvements in its system of power generation and distribution. At present it has three direct-current stations of rather ancient design, the largest being on the Gowanus Canal at the corner of Smith and Ninth Streets. At this point the company will erect a modern station with turbo units and alternating-current distribution, while the two other existing stations will be abandoned and in their place rotary sub-stations will be built. The plans for this work are being prepared by Ford, Bacon & Davis, engineers, of New York.



## THE BREAKING OF TROLLEY WIRES AT EARS

The discussion on the subject of the breaking of trolley wires at ears by the New York State Street Railway Association lends interest to a paper on this subject read by P. S. Sheardown before the Dublin section of the Institution of Electrical Engineers and reprinted in the London "Electrician." Mr. Sheardown states that the breakages usually occur at the spot where the wire joins the rigid suspension, and attributes the weakening of the wire at this point to four principal causes, viz.: (1) The blow of the trolley wheel against the butt of the ear, part of which comes against the wire. (2) The effect of the sparking which occurs at the same place, due to the trolley wheel losing contact with the wire. (3) The molecular change or crystallizing action in the wire due to what the author has termed the damping out of vibration in the suspended wire. (4) The bending or hinging action due to the upward pressure of the passing trolley wheels; and possibly, (5) overheating of the wire when being soldered.

He has found that usually the wires break first at the section insulators, where they are held most rigidly, then at frogs and crossings, and finally at ordinary ears and at splicing tubes. He believes that breakages from an actual tensile stress are rare. In such cases the section had pulled out very thin before fracturing.

As remedies, the author recommended first that the specifications require not so much a high tensile strength as some guarantee that the wire will be able to withstand in practice the bending and vibration stresses it will have to meet. In this connection he says that the Dublin company has secured excellent results with phono-electric wire. This wire has been in use in Dublin for six years, and, so far, only two breaks are on record. Its only disadvantages are that it is somewhat more expensive than hard-drawn copper, and it has less than half the conductivity of copper.

The second conclusion is that trolley wire should be so erected that there is smooth under running for the trolleys, and, if possible, should be so suspended that vibrations in the wire should be free to travel the whole length of the wire, and not hung so that, as far as vibrations are concerned, each span is insulated from the next, the vibration in each span of trolley wire being damped out at the adjacent ears. It would appear as if this construction would be secured with the catenary form of suspension, with which the author has had no experience.

The third conclusion to be drawn is that cars should be run with as little upward pressure of the trolley wheel against the wire as possible in order to reduce the hinging action at the ears. With this action in mind, the author is of opinion that trolley wire, especially when run from span wires, should be erected fairly taut and the span wires left on the slack side; but he does not think the short so-called flexible suspensions on bracket arms are of much assistance, except that these enable one to have better secondary insulation. The fourth conclusion is that, other things being equal, a company is not likely to get a very much longer life before breaking sets in from heavy wire in comparison with light wires, say 0000 compared with 0.

Lastly, as the fracturing referred to gives practically no external evidence that it is going to occur—indeed, in many cases takes place just inside the butt of the ear or under the frog clamps—careful inspection is of very little use, and the question to be asked on existing systems is what is best to be done, as, naturally, no one wants to re-

new the wire until wear makes it absolutely necessary.

The best way out of the difficulty, in the author's opinion, and the one which he has adopted throughout the Dublin system, is to anchor the wire at all suspensions after it has been up two years, but at section insulators it is safest to anchor them at once.

Anchoring the wire at section insulators, frogs and crossings is a comparatively simple matter. All that is required is a half-anchor ear and a piece of galvanized wire, as there is no difficulty about finding a place to anchor the wire firmly on to some part of the section insulator or frog; but when it comes to anchoring at the ordinary ear suspension, the matter is not so simple, if anchor ears were not put up in the first instance. One method would be to anchor to the span wire or bracket arm, but this would mean the cost of nearly double the number of insulators throughout the system, to say nothing of the fact that the more insulators there are on a job the greater the chance of trouble with them. The method which the author has adopted is known as the K. Q. patent anchoring device. It was designed by two of his assistants, and is at once both cheap in first cost and simple to put up. It consists essentially of a stamped steel plate with a hole in it through which the threaded portion of the insulator bolt passes. The plate to which the anchor wires are fastened is thus securely held in position at the top of the ear, but the strain of the broken wire comes direct on the bolt. The cost of this arrangement of anchoring, erected complete, is about \$70 per mile of double track.

It might be claimed that the wire would be liable to fracture at the end of the half-anchor ear, in the same way that it does at the ordinary ear; but the half-anchor ear, if properly designed, will have a sufficient grip of the wire and yet give smooth under-running. Moreover, it is much shorter than an ordinary ear, and is free to move with the wire instead of itself being fastened to a support. In Dublin anchoring has been employed at section insulators for about eight years, and at the present time every suspension is anchored except where the wire has been recently renewed. There are, therefore, about 8000 of these half-anchor ears in use, but on only two occasions has the wire failed at a half-anchor ear.

When the wire breaks at a suspension the anchoring device holds it in position, and, as soon as it is noticed, the emergency wagon is sent for and the men quickly make a temporary repair, and, beyond the fact that a few trolley wheels may leave the wire, no inconvenience or stoppage to traffic is experienced. Although as many as twenty broken wires per month have been reported during the past twelve months, only three have come to the ground. In one case the suspension was not anchored, in another the wire was held in the anchor all right, but was afterwards pulled down by a trolley head getting caught, and in the third case the wire broke outside the anchoring device.

## PENNSYLVANIA ORDERS STEEL CARS

The Pennsylvania Railroad has placed orders for two hundred steel passenger cars. Ninety of the cars will be made by the American Car & Foundry Company; eighty-five will be furnished by the Pressed Steel Car Company, and twenty-five will be built in the company's shops at Altoona. Of the eighty-five cars to be built by the Pressed Steel Car Company, sixty will be passenger coaches, twenty baggage and five combination.

## THE BRIGHTON BEACH IMPROVEMENT OF THE BROOKLYN HEIGHTS RAILROAD

The Brooklyn Heights Railroad Company, in connection with the Brooklyn Grade Crossing Commission, is making extensive changes in its Brighton Beach line to Coney Island. The main part of the work is about 5 miles long, and was undertaken to abolish grade crossings. The



THE WORK IN PROGRESS BETWEEN AVENUES G AND H

line was formerly the property of a steam road, the Brooklyn & Brighton Beach Railroad, which terminated in a depot at Atlantic and Franklin Avenues, Brooklyn. When the property was acquired by the present owners the depot was abandoned and an incline was built to connect the line with the elevated road in Fulton Street. As heretofore operated, the road ran down from the elevated structure into an open cut, which extended to Church Avenue in Flatbush, where it came to the surface and continued at street grade to Brighton Beach. The main part of the present work is the reconstruction of this latter stretch south of Church Avenue, the first  $1\frac{1}{4}$  miles being placed in an open cut and the remainder on an embankment.

The reconstruction is being done under authority of an Act of the Legislature, passed in 1903 and amended in 1905, which established the Brooklyn Grade Crossing Commission, whose duty it is to prepare the plans and specifications and superintend the execution of the grade crossing elimination. The Commission consists of five members appointed by the Mayor of New York, one being nominated by the Long Island Railroad and one by the Brooklyn Heights Railroad. The cost is to be equally divided between the railroad company and the city, except that the limit of the city's expenditure is \$1,000,000.

The Brighton Beach line from Church Avenue south serves a rapidly growing residence section, and this fact, in addition to the very large summer traffic to the Coney Island resorts and the Sheepshead Bay race track, in-

fluenced the railroad company to build a four-track system on the new work to replace the two tracks now in operation. When the improvement is completed an express service will be inaugurated on the two inside tracks. Work was started on Dec. 30, 1905, and it is hoped to have it sufficiently completed by June 15 of this year to operate two tracks. The reconstruction described in this article starts near Church Avenue. The roadbed for  $1\frac{1}{4}$  miles south of this point will be depressed 10 ft. to 22 ft. below street grade, the sides being protected by concrete retaining walls and the depression spanned by plate girder bridges carrying the streets. The grade finally rises to cross over the tracks of the Bay Ridge division of the Long Island Railroad, and for the remaining distance the roadbed will be elevated about 12 ft. above the ground.

The material in the cut, amounting to 230,000 cu. yds., was sand and gravel, and this fact, combined with the high value of the property bordering the right of way, made it cheaper to build retaining walls than to purchase extra land for slopes. The walls under 14 ft. have a vertical face, and the higher ones a recessed face with curves joining it to the faces of the coping and the footing. The walls are built on an easement of 7 ft. granted by the owners of the abutting property. They are of 1:3:5 gravel concrete made with giant Portland cement, and rest on gravel foundations about  $3\frac{1}{2}$  ft. below the roadbed. Vertical expansion joints with a V-shaped groove on the surface are left every 50 ft., tar paper being used to separate the abutting sections. In the interior of the walk are placed vitrified clay conduits for carrying wires. They are made up of sections 18 ins. long connected by iron dowels, with the joints wrapped with two laps of cloth 6 ins. wide, dipped in cement grout before being applied. Manholes for handling the wires are built into the walls every 400 ft.

The problem of draining the cut proved a difficult one. It was desirable to avoid raising the streets to pass over



POWER SHOVEL AT WORK ON THE BRIGHTON BEACH LINE

it, but to do this would have required a depression of the roadbed which would have made gravity drainage impossible. A compromise was, therefore, effected which, with the use of very light drainage grades, allowed the run-off to be diverted to the city's sewerage system. Concrete troughs are built the full width of the right of way at intervals of about 600 ft. and connected with a drain which runs the full length of the cut. This system is connected with the city system and is made through a 36-in. sewer

1½ miles long. The transverse troughs vary in width from 18 in. to 24 in. They are covered with iron gratings and are spanned by yellow pine stringers, 10 ins. square, carrying the rails. In addition to this system, rapid drainage is provided by ditches lined with granite blocks, with a covering of cement grout located between the outside tracks and the retaining walls.

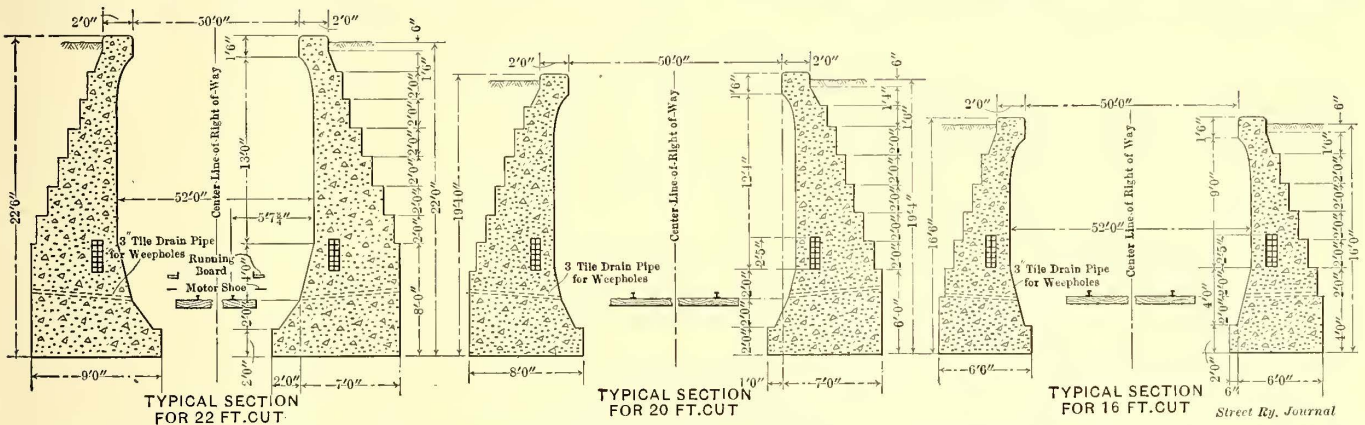
At one street intersection a 10-ft. circular sewer crossed the right of way at an elevation which required its rebuilding. The street was torn up for 60 ft. each side of the railroad property lines and the sewer reconstructed with a section having an extreme depth of 7 ft. 2 ins. and a width of 14 ft. 6 ins. Part of the old invert was left undisturbed, and a flat roof of reinforced concrete and vertical side walls built around it. The rails for the track are carried over the roof in troughs made of plates and angles. The flow in the sewer was not obstructed at any time, a flume of sufficient size to care for a moderate storm having been built in the old sewer before the reconstruction was started.

The tracks begin to rise a short distance north of the

ing outward, run about 600 ft. apart. Under the new plans the old right of way of the Long Island Railroad will be abandoned and its tracks transferred to the fill on which the Brighton Beach line will be built, thus making a six-track



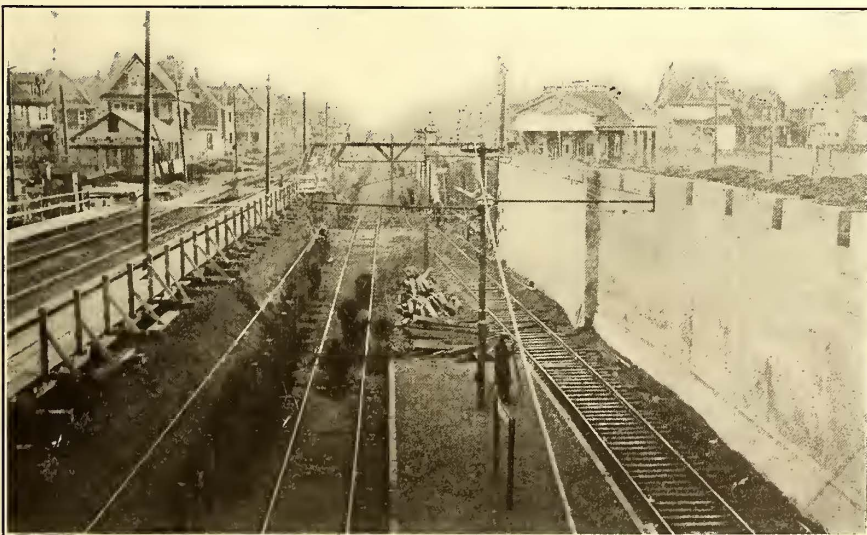
PART OF COMPLETED RETAINING WALL



RETAINING WALLS THROUGH DEPRESSED PORTION OF RIGHT OF WAY BETWEEN CHURCH AVENUE AND LONG ISLAND RAILROAD

Manhattan Beach division of the Long Island Railroad, which will be crossed on a plate girder bridge. Heretofore the crossing has been the reverse of this condition.

embankment. The changes on the Long Island system are being carried on as a part of the Bay Ridge improvement, which is also under the control of the Brooklyn Grade Crossing Commission. The embankment will contain about 1,000,000 cu. yds., the cut above described furnishing about 230,000 cu. yds. and the remainder coming from the Bay Ridge improvement.



VIEW FROM BRIDGE AT NEWKIRK AVENUE FACING THE SITE OF A NEW STATION

Just east of this crossing a Y leads off the Long Island Railroad and a double-track system runs parallel to the Brighton Beach line as far as Coney Island, the two lines being close together for a short stretch, and then, swing-

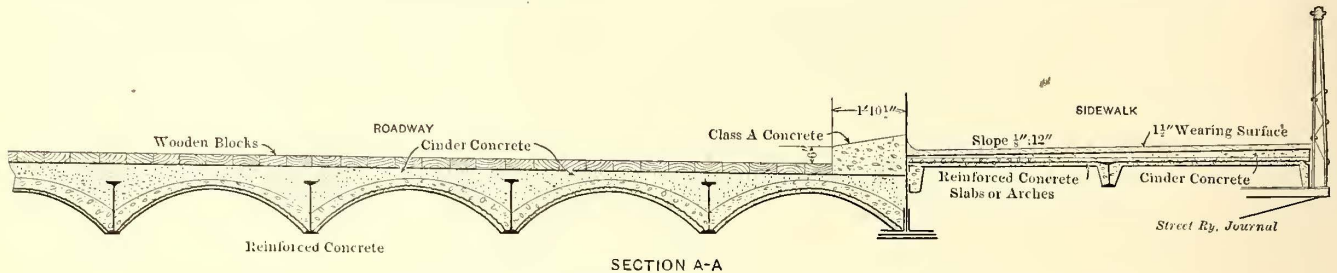
The streets intersecting the right of way are carried over the cut on plate girder bridges, and on the south end under the embankment through subways spanned by the same type of bridge. The maximum height that any street was raised was 7 ft. and the maximum gradient 3.3 per cent. The maximum street depression was 4 ft. All bridges have solid reinforced concrete floors.

The construction work in the cut was carried on under very adverse conditions. The contract required the maintenance of traffic, and this, combined with the fact that the entire plant had to be confined to the right of way and the easement strips, a total width of 64 ft., necessitated skilful arrangement and handling. The contractor was allowed to use the operating tracks for spoil service so long as it did not interfere with the regular traffic. Work was started

at the south end of the cut, near the point where the contractor had established his auxiliary plant, and opened a gravel pit. A track was built on the east easement strip and used for an operating track, while the western one of the two original tracks was used for spoil service. A trench was then excavated in the west easement strip, the material being shoveled by hand into tubs which were swung by a derrick over to the spoil track and dumped into cars. Operations were carried on at three points simultaneously. The trench was sheeted as the work progressed, and the

bridging was required in all portions of the work in providing for street traffic.

As the material taken from the cut contained sand and gravel of the grades required for the concrete, a screening and washing plant was installed by the contractor. A spur from the main track led to a depressed hopper, consisting simply of a sheeted trench, beneath which ran a Robbins belt conveyor for elevating the material to the screen. The spur track was high enough to discharge by gravity into the hopper, and the screen likewise was high



SECTION OF PAVING FOR HIGHWAY BRIDGES

forms for the retaining wall put in place and concreting begun. As soon as the wall was completed for a sufficient length, a derrick operating a Hayward orange-peel bucket was put in service and removed the material on the inside of the wall until a sufficient width had been excavated to subgrade to allow one or two tracks, depending on the location, to be thrown into the trench. Traffic was then diverted through this cut, single-track operation being carried on for about three-quarters of a mile. The temporary track was next removed from the east easement strip and the construction of the east wall proceeded in a manner similar to that described for the west wall. When the forms were ready to be taken down a steam shovel was cut in to remove the core of spoil between the two walls.

The concrete mixers, three in number, were generally set up at the end of the blocks and the concrete delivered to its place in the wall in

cars running over the trench on a narrow gage track furnished by the Henry J. McCoy Company. The Ransome mixers were elevated so as to discharge by gravity into the cars, the materials being raised to them by bucket conveyors. The total amount of concrete in the cut is about 40,000 cu. yds., and it was placed at a rate as high as 180 cu. yds. per day per mixer.

South of the Long Island Railroad crossing the work was carried on without the inconvenience experienced in the cut. The work consisted merely in making the embankment, and, since the Brighton Beach trains were operated over the Manhattan Beach tracks, no special provision for regular traffic was required. Considerable temporary

enough to discharge by gravity into the cars provided for hauling away the sorted and washed material. Near the screening plant is a crusher made by the Good Roads Machinery Company, a gravel pit, a blacksmith shop and a cement warehouse. Owing to the high cost of water, \$1 per 1000 cu. ft., the contractor determined to secure an independent supply, and accordingly sank a 3-in. well and installed an electrically-driven pump. A supply pipe, with

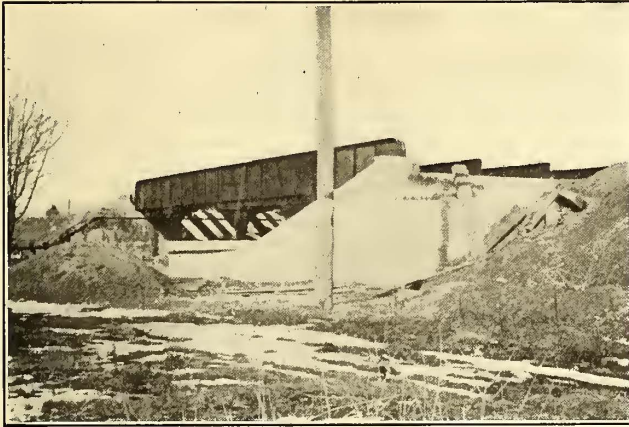


A VIEW ALONG THE BRIGHTON BEACH LINE NEAR A STATION

taps every 400 ft., was laid the entire length of the work, and furnished a handy supply for concrete, the engines and the steam shovel. The pump was a triplex pump with a capacity of 60 gals. per minute, and was made by the Platt Iron Works. It was driven by a 10-hp, 500-volt General Electric motor, supplied with power from the trolley wires. The installation, allowing for the depreciation of the plant, has reduced the cost to about half of the charge for city service. The contractor used three Mogul locomotives weighing 60,000 lbs. each, forty flat cars with a capacity of 50,000 lbs., and thirty-six 6-yd. Oliver dump cars.

The work is under the supervision of the Brooklyn Grade

Crossing Commission, J. H. Dwyer being engineer in charge; H. B. Snell, principal assistant engineer, and C. T. Bissell, resident engineer. All the work in the cut and the filling as far south as Avenue O is being done by Charles Cranford, with R. L. Russell as chief engineer. The embankment south of Avenue O is being built by the Brook-



A HIGHWAY CROSSING ON THE BRIGHTON BEACH LINE

lyn Heights Railroad, W. S. Menden, chief engineer. Milliken Bros., of New York, furnished all the steel for bridges and stations, and the Abbott-Gamble Company built the bridge floors.

### UNFAIR COMPETITION FORBIDDEN IN OHIO

An important decision, affecting the rights of steam railroad companies in Ohio to discriminate in their passenger rates to the detriment of electric railway companies, was handed down by the Railroad Commissioners of that State on April 18. The case was that of Aaron E. Price, of Athens, against the Hocking Valley Railway Company. This is a steam railroad corporation, which for part of its line is paralleled by the Scioto Valley Traction Company, an electric line. Owing to this fact, the railroad company has reduced its fares on the line which is paralleled by the Scioto Valley line, but not on others. Mr. Price alleged that such a practice was in violation of the State statute which provides that it is unlawful for a public carrier "to give undue or unreasonable preference or advantage to any particular person \* \* \* or locality, or any particular description of traffic, or to subject any particular person \* \* \* or locality, or any particular description of traffic, to any undue or unreasonable prejudice or disadvantage in any respect whatsoever." He showed, for instance, that Athens, which is outside of the competing territory, is 76.3 miles from Columbus, measured along the right of way of the railroad company, while Lancaster, which both lines reach, is 31.5 miles from Columbus, measured along the right of way of the company. The fare from Athens to Columbus is \$1.55 for a single ticket and \$3.10 for a round-trip ticket, or at the rate of 2 cents a mile. On the other hand, the company sells between Lancaster and Columbus what is known as a "twin ticket," which entitles the holder to one round trip or two passengers to travel on the same train for 75 cents, or at the rate of 1.19 cents per mile. The single fare on the Hocking Valley between Lancaster and Columbus is 65 cents. The single and return fares between Lancaster and Columbus on the Scioto Valley Electric are 60 cents and \$1, respectively.

The Hocking Valley Railroad Company, in its defense, claimed that the rate to Athens was within the 2-cents-per-mile rate permitted by law, that the Lancaster tickets were limited to ten days, whereas the Athens tickets could be used within thirty days, that the Lancaster rate was a commutation rate intended to meet electric competition and encourage suburban residence, and that the rulings of the Interstate Commerce Commission justified the right of a carrier to consider competition as a factor in rate making. These defenses were not considered adequate by the Commission, which, in referring to the Ohio statute, said: "It is not the purpose of the law to require the State to act in a paternal manner towards its creatures, but it should be the policy of the State to prevent the destruction of one public service concern, which exercises a part of the sovereign power, at the hands of another and stronger competitor. This seems to us to be the true doctrine of public policy."

As a result, the Commission decided that the rate was adopted not to meet but to destroy competition, and issued an injunction against the steam railroad company, requiring it to cease from this unreasonable and unjust discrimination. The attorneys were H. M. Daugherty, for the complainant, and C. O. Hunter, for the defendant.

### PREPARING THE FORT WAYNE-LAFAYETTE LINE FOR OPERATION

Anticipating the inauguration of interurban service between Fort Wayne and Lafayette July 1, Superintendent John B. Crawford, in charge of the traffic department of the Fort Wayne & Wabash Valley Traction Company, is working out the details for the schedule between the two cities. When the road is completed, the company will have a line 110.3 miles in length. With the inauguration of service between Fort Wayne and Lafayette the limited through service between Fort Wayne and Indianapolis by way of Peru will cease. Limited cars will be run between Fort Wayne and Lafayette and will connect at Peru with limited cars to and from Indianapolis. It is probable by that time that through service between Fort Wayne and Indianapolis will be established by way of Muncie and Bluffton, a route that is about 12 miles shorter than the present route. Before this route can be established, however, it will be necessary to raise the Big Four bridge at Hartford City. The Fort Wayne & Wabash Valley limited cars now used in the Indianapolis-Fort Wayne service will be used between this city and Lafayette, and a first-class buffet service will be maintained. The schedule for the Fort Wayne-Lafayette service will include four limited cars each way daily. They will leave Fort Wayne at 6:20 a. m., 10:30 a. m., 3 p. m. and 7:20 p. m., and will arrive there from Lafayette at 10:05 a. m., 2 p. m., 7:45 p. m. and 11:15 p. m.

The Montreal Street Railway Company has adopted a new style of transfer slip, which is less complicated than the one previously in use. The transfer is punched from the direction from which the passenger boards the car and the time same is due at the transfer point. The company has requested passengers to ask for transfers when they pay their fares.

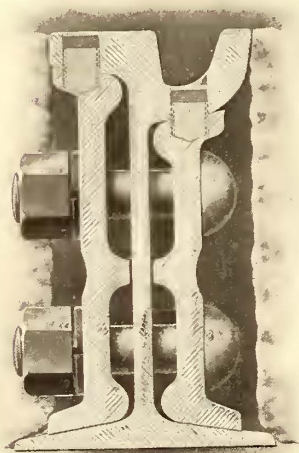
## A SIMPLIFIED METHOD FOR INSTALLING PLASTIC RAIL BONDS

Harold P. Brown, of New York, whose plastic rail bond is so well known, has devised a new type which can be in-



BANK OF LAMPS FOR NIGHT WORK

stalled without tearing up the street, removing the angle plate or interrupting traffic. It is so constructed that it will not shear off; in fact, it is claimed that when placed



SECTION SHOWING POSITION OF PLASTIC BONDS

in the head or tram of the rail every wagon that passes over this bond really increases its efficiency. On exposed T-rails the bond holes are bored through the flange of the angle plate, and into, but not through, the base of the rail. A glance at the accompanying illustrations will show how this is accomplished.

The installation is carried out with an electric drill equipped with tungsten steel drill points that require no lubrication and will bore 1000 holes without regrinding. The drill is held in position by a magnetic clamp, which, in itself, is a most ingenious contrivance. It is fitted with wheels for conveyance from place to place. Interchangeable shoes to fit any type of rail are used; the coils are heavily insulated and boxed in, thus protecting them from possible damage. As shown in one of the illustrations, lamps can be placed on the outside of the box, thus permitting night work. The current for both the clamp and the drill is obtained through a hooked-shape wire attached to a pole and suspended from the overhead wire. Upon the approach of a car this pole can be instantly removed, thus releasing the clamp and giving a clear track for the car. This equipment enables such rapid and efficient work that one mechanic and two laborers can bond from seventy to one hundred joints a day.

Those who visit the Jamestown Exposition within the next few weeks can see this apparatus in active operation installing plastic plugs on the Norfolk & Portsmouth Traction Company's system.

## ATTRACTIVE CIRCULARS OF TWIN CITY COMPANY

The Twin City Rapid Transit Company, of Minneapolis, has recently issued two very attractive booklets dealing with its lines, entitled "Twin City Trolley Trips" and "Air-Ship View of Beautiful Big Island Park and Lake Minnetonka." The cover of the first of these is in colors and represents a view at night along the great white way to Lake Minnetonka. It is an excellent specimen of printing, the color combinations harmonizing nicely. In the center of the folder is a panoramic view in colors of the company's lines, showing the famous lakes, rivers, parks and resorts. The booklet is formally addressed thus: "To



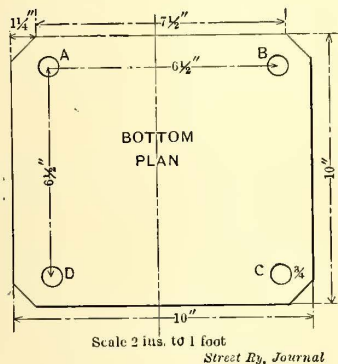
DRILLING A HOLE FOR THE BOND

the Visitor in the Twin Cities." As A. W. Warnock, the passenger agent of the company, says in a sub-heading, it is "A Tale of Two Cities"—prosperous, progressive, picturesque. The Air-Ship View contains, besides the panorama of Big Island Park and Lake Minnetonka, a picture story of Big Island Park and the Lake Minnetonka boats.

## CONCRETE POLES

Wood suitable for pole construction in all electrical work is growing scarcer every year, and the condition is especially serious in railway service because a railway company is usually required to comply with certain city ordinances respecting the quality of the poles used. The life of wooden poles depends largely upon climatic conditions, but may be said to vary from seven to eleven years, according to the kind of wood used, local conditions and maintenance precautions. The climate of Southern regions is particularly hard on wooden poles unless some method of preservation is used. Steel poles are expensive in first cost and maintenance. The point of deterioration in this class of structure is usually at the ground line, where a rusting action sets in which will eventually cause the destruction of the poles. Attempts have been made to remedy this defect by the introduction of sleeves and the use of a concrete base, but impose an additional cost to the already high initial expenditure. To overcome these difficulties, the concrete pole has been devised and patented by J. L. Weller, superintending engineer of the Well and Canal, at St. Catharines, Ont., and a number of these poles are in use in that city, Toronto and elsewhere in Ontario.

It is claimed in its favor that the concrete pole does not succumb to the attacks under which a wood or



PLAN OF POLE



CONCRETE POLE

steel pole will fail. No paint, above ground, is necessary to improve its appearance, as the concrete is, in itself, of a pleasing gray color. Concrete is practically a non-conductor, and instances have been noted where bare electric cables have become detached through the breaking of an insulator and have come in contact with the concrete pole without interruption to the circuit. Closely allied with this is the fact that lightning does not harm this pole, as the steel reinforcing rods, to be described later, act as a ground when a ground and top lead are provided.

The pole developed by Mr. Weller is essentially the frustum of a pyramid, built of concrete and reinforced by four steel rods running throughout the entire length. The steel is so arranged to obtain as nearly as possible the theoretical requirements, viz.: that the stresses increase from the top to the bottom of the pole, when a horizontal strain is applied, in a direct ratio to the distance from the

top. To meet this requirement the steel reinforcement should increase from nothing at the top to a maximum at the bottom. While not absolutely feasible, this effect is practically obtained by rods of various lengths and increasing in cross-sectional area from the top to the bottom. This gives a tapering reinforcement, and, as the concrete and steel are in a constant ratio, the pole is tapering, as is the case in ordinary wooden pole structures.

Poles constructed along these lines have been built under the Weller patents by the Concrete Pole Company, of St. Catharines, in lengths varying from 25 ft. to 150 ft. The smaller poles were constructed to withstand a horizontal strain of 500 lbs or 1000 lbs., and the 150-ft. poles a strain of 4000 lbs applied at the top. In transmission lines, of which about 15 miles have been equipped, the heights of the poles are generally from 35 ft. to 50 ft. and carry strains of 2000 lbs., with several strains of 10,000 lbs. The weights of the finished poles vary with the different strains they are required to stand. For instance, a 30-ft. trolley pole to stand 500 lbs. weighs about 1300 lbs., while a pole of the same length for 1000 lbs. will weigh about one ton. The 150-ft. poles, to stand the 4000-lb. strain previously mentioned weigh about 45 tons. In all of these cases the calculated strength has been very close to the actual strength of the pole as determined by tests. In many cases there was not a difference of 25 lbs. between the calculated and actual strength. It will thus be seen that the greatest economy of construction is obtained.

In the building of the pole a wooden form is used, conforming in size to the estimated size for a given strain. As a matter of structural convenience, the cross section is made square with the corners chamfered off. The mold is made in sections of the most economic length for poles of a certain height. The bottom of the mold is first set in position, horizontally, on the ground. Then the sides, with the molding for the corner chamfers attached, are set to the required taper and held there by means of an occasional clamp on the outside. The top of the mold is left open and the concrete is given a smooth finish by troweling. The reinforcing rods are placed in when the mold is complete and are held in position, temporarily, while the concrete is being placed. They are not connected in any way at the top or bottom.

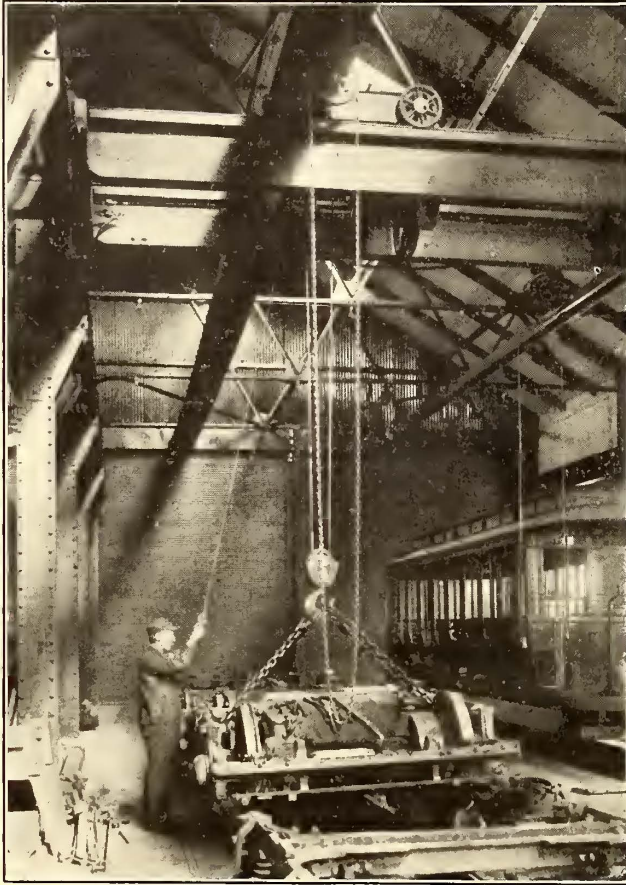
The best results are obtained from concrete compounded of one part of cement to four or five parts of clean lake or washed gravel, although good results are obtained with the use of broken stone. The concrete is put in throughout the entire length of the pole at once, and is well tamped in place.

The cost of the concrete pole varies with the location; but, generally speaking, it is about one-third less than that of steel. As compared with wood, the concrete pole is initially more expensive, but a fewer number of poles are required and there is no maintenance expense. There is also an increased safety from wind pressure. The concrete structure has carried lines during a 60-mile gale under which a wooden line would have been demoralized.

The accompanying illustration shows a 30-ft. span pole in St. Catharines, and is one of some eighty poles of that size that have been in use for some time. They have proved so successful that the local company has placed an order for additional concrete poles. The city of Toronto has also some ten concrete poles which have been in use for three years, as an experiment. The Windsor, Essex & Lake Shore road, of Windsor, Ont., has ordered one hundred concrete poles for use this coming season.

## ELECTRIC TRAVELING CRANES AT COLD SPRINGS CAR HOUSE, BUFFALO

The installation of electric traveling cranes for lifting car bodies, trucks, etc., in the shops of the International Rail-



SINGLE CRANE AS USED TO LIFT TRUCK

way Company in the car houses at Cold Springs, near Buffalo, N. Y., consists of four 10-ton, 3-motor electric "Northern" cranes, controlled from the floor, each crane being equipped with a 5-ton low type Northern crane trolley. The span of each crane is approximately 30 ft. By using two trolleys and the lifting beam the car body is lifted off the trucks, as shown in the accompanying illustration, and new trucks rolled into place. With two cranes together the entire car body can be lifted and moved to any portion of the shop. Trucks or motors, etc., are lifted by one trolley, as shown in the engraving. The crane ridges are traveled by an electric motor, and each hoist is operated by an independent electric motor. The travel of the trolleys across the bridge is accomplished by hand power.

The conditions at Cold Spring were such that a low type trolley was necessary, and for this reason the Northern low type electric crane was selected, as it occupies but little head room. The hoisting speed is 10 ft. to 25 ft. per minute, the bridge travel speed 200 ft. to 250 ft. per minute.

A pit, approximately 5 ft. deep, extends between the rails of each track. The height above the rails to the ceiling is approximately 19 ft., and the space occupied by the

cranes is approximately 3 ft. above the runway rail. The cranes take current from the regular overhead track wires above the pit, these wires being supplemented by a ground wire for the crane. Thomas Pumfrey planned the installation for the International Railway Company, and the equipment was installed by the Northern Engineering Works, of Detroit, Mich.

## MORE SEMI-CONVERTIBLE CARS FOR FITCHBURG & LEOMINSTER RAILWAY

The Fitchburg & Leominster Street Railway Company has lately added to its rolling stock four Brill grooveless post, semi-convertible cars to be used for general traffic between Ayer and Fitchburg. It was in the fall of 1902 that this road purchased its first Brill semi-convertible; in fact, the car was the first of the type to come into the State, and the chief reasons for its continued use, as set forth



SEMI-CONVERTIBLE CAR FOR FITCHBURG & LEOMINSTER  
STREET RAILWAY

by W. W. Sargent, superintendent of the road, are its popularity and the ease with which it can be changed over.

The chief dimensions and features of the new cars follow: Length over end panels, 33 ft. 4 ins.; over vestibules, 42 ft. 9 ins.; width over sills, including sheathing, 8 ft. 2½ ins.; over posts at belt, 8 ft. 6 ins.; size of side sills, 4 ins.



TWO TROLLEYS FOR LIFTING CAR BODY

x 7¾ ins.; end sills, 5¼ ins. x 6⅞ ins.; sill plates, 15 ins. x ⅜ in. The cars are mounted on 27-E1 trucks, with a wheel base of 6 ft. Four motors, of 40-hp capacity each, are used on each car. The interiors are of cherry, with ceilings of birch veneer. This type of construction permits a 37-in. seat with aisle space of 24 ins.



## FINANCIAL INTELLIGENCE

WALL STREET, May 8, 1907.

### The Money Market

There has been no material change in the monetary situation during the past week. The demand for money from all sources has been comparatively light, resulting in somewhat lower quotations for all classes of accommodations. Early in the week preparations for the May 1 interest and dividend disbursements caused an advance in the call loan rates to 4 per cent, but this was followed by a drop to 2 per cent at the close. In the time loan department business was practically at a standstill, and notwithstanding further concessions on the part of lenders of about  $\frac{1}{4}$  per cent in the asking rate, they experienced considerable difficulty in placing their funds. Corporate borrowing continues. The most important development in this connection during the week was the decision of the Atchison directors to issue about \$26,000,000 ten-year 5 per cent convertible bonds. The subscription price of the bonds has been fixed at par and accrued interest, payable 30 per cent at the time of subscription, 35 per cent between Jan. 5 and Jan. 10, 1908, and 35 per cent between June 5 and June 10, 1908. The payment of these bonds covers such a wide period that little or no disturbance will be caused to the local money market. Reports that the Secretary of the Treasury will withdraw part of the \$35,000,000 special deposits made with the national banks at the close of last year, were revived, but up to this time no official announcement has been made from Washington regarding the Secretary's intentions in this matter. The sharp advance in foreign exchange to the highest rate of the year caused more or less talk of gold exports to Paris, but according to leading authorities such transactions are out of the question at this time. The European situation remains practically unchanged. Open market discount rates are materially below the official figures, but no change in the latter is expected for the present. The Bank of France continues to draw gold from London, and until the former institution recovers all of the gold sent to London earlier in the year, it is not likely that there will be any change in the Bank of England discount rate or in that of the Bank of France.

The bank statement published last Saturday was very disappointing. Loans showed a further expansion of \$16,902,700, making a total increase in that item of \$85,000,000 during the past four weeks. Cash decreased \$1,918,000. Deposits increased \$14,416,600, which resulted in an increase in the reserve required of \$3,604,150 over the preceding week. The surplus reserve therefore was reduced by \$5,522,150, leaving the total surplus at \$6,824,625, as compared with \$5,899,525 last year and \$18,729,425 in the corresponding week of 1905.

### The Stock Market

Trading on the Stock Exchange was comparatively quiet during the past week, and was accompanied by an irregular price movement. At the beginning of the week the market displayed pronounced strength, but in the subsequent dealings the early gains were in many instances wiped out. The speculation was entirely professional, there being nothing in the commission house business to indicate an active interest in the market on the part of the so-called outside public. The principal factors working for the decline during the last half of the week were the crop damage reports and the probable course of the money market in the immediate future. Reports from the winter and spring wheat districts were decidedly unfavorable, and while these reports caused considerable selling of stocks by professionals there was a general disposition on the part of the more conservative element to await the Government crop report to be made public at the close of the week. So far as the money market is concerned there is nothing in the situation calculated to cause any material change in rates for money in the near future. Funds are now in ample supply and rates for time loans are lower than those prevailing at the close of a week ago. The sharp advance in sterling exchange to the highest rates of the

year suggested exports of gold to Paris, but it may be said upon competent authority that such operations are entirely out of the question at this time. Rates are nearly a full cent below the point at which shipments of the yellow metal can be made profitably, and even should the Bank of France allow interest on the gold while in transit, which is unlikely, it is doubtful if such transactions could be made without a loss to the shipper. The strike of the freight handlers of the Trans-Atlantic and the coastwise lines and the fears that the struggle may extend to the railroads, also had a depressing influence. Monetary conditions abroad are highly satisfactory. The general business situation remains practically unchanged. The activity in iron and steel continues, while the position of copper metal is very strong.

### Philadelphia

Although the trading in the local traction issues was upon a comparatively small scale during the past week, prices generally showed strength, and in some instances substantial gains were recorded. Philadelphia Rapid Transit was the active feature of the group. Opening at  $21\frac{5}{8}$ , it eased off to  $20\frac{3}{4}$ , and later rallied to  $21\frac{1}{4}$ . On May 6 the assessment of \$5.00 was paid, making the stock \$35 paid in, and sales on the new basis were made at from  $26\frac{1}{8}$  to  $25\frac{7}{8}$ . About 12,000 shares were traded in. Union Traction was decidedly firm, with transactions at  $59\frac{7}{8}$  and 60. Philadelphia Company common sold at  $44\frac{1}{4}$  and 44, and preferred sold at  $45\frac{1}{2}$  and 45. Philadelphia Traction was firm at 94. Other sales included American Railways at  $49\frac{3}{4}$  and 50; United Traction of Pittsburg preferred at 47, and Lehigh Valley Transportation at  $12\frac{3}{4}$ .

### Chicago

There were no important developments in the local traction situation during the past week. Deposits of the stocks under the plan have been fairly large and fully up to expectations. Trading in the street railway issues was extremely light and prices remained practically unchanged. Union Traction common advanced from  $4\frac{1}{4}$  to  $4\frac{5}{8}$ , and the preferred sold at  $15\frac{1}{2}$ . Metropolitan Elevated preferred was dealt in at 65, and Chicago & Oak Park common sold at 4.

### Other Traction Securities

The market for traction issues at Baltimore was exceedingly quiet but strong. United Railway incomes furnished the active feature of the trading, upwards of \$30,000 selling at 55 and  $55\frac{1}{4}$ . The 4 per cent bonds sold in small amounts at  $87\frac{1}{4}$  and  $87\frac{1}{2}$ , and the new refunding 5s changed hands at  $84\frac{1}{2}$ . The free stock declined from  $13\frac{3}{4}$  to 13. Other transactions included Norfolk Railway & Light 5s at  $97\frac{1}{4}$ , Macon Railway & Light 5s at  $96\frac{1}{2}$ , and Washington City & Suburban 5s at  $101\frac{1}{2}$ . The feature of the Boston market was a decline of 2 points in Boston Elevated to 139 on light transactions. Massachusetts Electric common, after an early advance to 17, lost nearly all of the improvement. Boston & Worcester was active at  $26\frac{1}{2}$  and 26, and sales of the preferred were reported at 71. West End common sold at 88 and  $88\frac{1}{2}$  and the preferred at 105.

Owing to recent decision of the local courts in favor of the Cleveland Electric within the past week its stock has advanced several points from the low level it reached a few days before, when seemingly a raid was made on it, following the granting of franchises to the opposition companies over the two routes on which it is now taking up its tracks. Moreover, there has been considerable trading in its securities and confidence is expressed in its future, although any settlement must result in reduction of fares. On Saturday the Forest City showed a decline of  $\frac{3}{4}$ , and this continued on Monday. Northern Ohio sold at  $27\frac{1}{2}$ , several fair sized blocks of stock going at that. In all, the week was rather more active than usual in traction securities.

The traction shares moved in sympathy with the general market. The announcement from Albany that the Republican Senators had decided to accept the Governor's utilities bill had very little influence on prices.

### Security Quotations

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

	May 1	May 8
American Railways .....	49%	49%
Boston Elevated .....	a140	a138
Brooklyn Rapid Transit .....	58%	60%
Chicago City .....	180	180
Chicago Union Traction (common).....	4 1/4	4 1/2
Chicago Union Traction (preferred).....	15 1/4	14 1/2
Cleveland Electric .....	—	51 1/2
Consolidated Traction of New Jersey.....	73	74
Detroit United .....	70	70
Interborough-Metropolitan .....	25	24 1/2
Interborough-Metropolitan (preferred).....	59 1/2	58 1/2
International Traction (common).....	—	—
International Traction (preferred), 4s.....	—	—
Manhattan Railway .....	139 3/4	138 1/2
Massachusetts Elec. Cos. (common).....	16	16
Massachusetts Elec. Cos. (preferred).....	57	57
Metropolitan Elevated, Chicago (common).....	24	a26
Metropolitan Elevated, Chicago (preferred).....	a65	a65
Metropolitan Street .....	94	92 1/2
North American .....	75 3/4	72 1/2
North Jersey Street Railway .....	40	40
Philadelphia Company (common).....	44	44
Philadelphia Rapid Transit .....	21 1/4	†25 1/4
Philadelphia Traction .....	94	94
Public Service Corporation certificates.....	62	61
Public Service Corporation 5 per cent notes.....	92	92
South Side Elevated (Chicago).....	80	81
Third Avenue .....	115	108
Twin City, Minneapolis (common).....	95 1/2	94
Union Traction (Philadelphia) .....	59 1/2	59 1/4

a Asked. † Assessment paid.

### Metals

The "Iron Age" says the foundry iron markets are firmer throughout the country. There has been some movement of basic iron in the East, sales for the week being 35,000 to 40,000 tons. The railroads do not seem to be taking hold very vigorously in their purchases for delivery in 1908. Structural shops have taken comparatively little business.

Copper metal continues strong. The large selling companies quote 25 1/2 cents for Lake and 25 1/4 cents for electrolytic.

Owing to continued advance in the prices of raw materials, particularly of pig iron, and evidence that these higher values will rule for some time, a prominent manufacturer of engines predicts a very sharp advance in prices to take care of the increased cost of materials.

### RAILWAY MEETING OF THE A. I. E. E.—PAPERS ON RAILWAY AND OTHER TOPICS FOR ANNUAL MEETING

A railway meeting of the American Institute of Electrical Engineers is scheduled for May 21, when Frank J. Sprague is to present a paper on "Facts and Problems Relating to Electric Trunk Line Operation."

A number of papers on railway and allied topics have also been announced for the Niagara Falls meeting, which occurs June 25-28. Among them are:

"Some Power Transmission Economies," by F. G. Baum.

"One-Phase, High-Tension Power Transmission," by E. J. Young.

"Attitude of Technical Schools Toward the Profession of Electrical Engineering," by H. H. Norris.

"Track-Circuit Signaling on Electrified Roads," by L. F. Howard.

"Engineering Specifications," by C. W. Ricker.

"Vector Diagrams of Single-Phase Commutating Motor," by W. I. Slichter.

"Regeneration of Power from Electric Railway Motors," by William Cooper.

"Switchboard Practice for Voltages of 60,000 and Upward," by S. Q. Hayes.

There are also to be two topical discussions at the Niagara Falls convention, they are on "Single-Phase vs. Multi-Phase Generators for Alternating-Current Roads," and "Standardizing the Frequency for Alternating-Current Roads," and are to be led by A. H. Armstrong, railway engineering department of the General Electric Company, and N. W. Storer, of the Westinghouse Electric & Manufacturing Company.

### SOUTHERN PACIFIC RUSHING WORK ON ELECTRIC LINES

The Southern Pacific Railroad has announced, through General Manager Calvin, that it will soon have the narrow-gage line to the Alameda mole in complete running order as an electric railway, and that it is proposed to give a fast electric train service on that line. All of the equipment has been ordered and is being moved forward as rapidly as possible, and during the summer a large force of men will be kept at work making the necessary changes for the conversion from steam to electric power. One of the features which will be then introduced will be a fast electric train service between Oakland and Alameda, with the Oakland terminus at Fourteenth Street. As soon as the narrow-gage road has been changed the force of men will be immediately put at work making the same change on the Seventh Street line to cover the service to the Oakland mole. On Sept. 1 a new ferryboat will be added to the service between San Francisco and Oakland, and it is proposed to change the engines on the existing boats with a view to increasing materially their speed, so that a 20-minute service may be maintained between both sides of the bay.

### ANNUAL REPORT OF THE PITTSBURG RAILWAYS COMPANY

The fifth annual report of the Pittsburg Railways Company for the year ended March 31, 1907, as just made public, shows earnings as follows:

INCOME ACCOUNT	
Gross earnings from operations.....	\$10,232,619
Operating Expenses:	
General expenses .....	\$851,909
Conducting transportation .....	3,243,327
Maintenance of way and structures.....	511,057
Maintenance of equipment .....	632,982
Park expenses .....	132,238
Total operating expenses.....	\$5,371,514
Bridge Tolls .....	108,733
Taxes .....	291,711
Total operating expenses and taxes.....	5,771,957
Net earnings .....	\$4,460,662
Other Income:	
Rent of buildings and real estate.....	\$47,876
Interest and discount .....	5,014
Miscellaneous .....	31,013
Total other income.....	83,903
Total income .....	\$4,544,565
Deductions from Income:	
Rentals of leased properties:	
Pgh. & Castle Shannon R. R. Co. ..	\$15,000
United Traction Co. of Pittsburg..	552,485
Consolidated Traction Company... ..	1,550,598
Brunot Island power station.....	60,169
Total .....	2,178,252
Miscellaneous interest and discount.....	278,515
Tenement expenses .....	2,693
Total deductions from income.....	2,459,460
Net income before deducting fixed charges and extraordinary maintenance expenses .....	\$2,085,104
Fixed Charges:	
Interest on funded debt of Pittsburg Railways Company and leased companies .....	1,734,200
Net income after deducting fixed charges.....	\$350,904
Extraordinary maintenance expenditures.....	\$300,131
Car Trust notes issued Dec. 1, 1905, retired during year .....	40,000
Total .....	340,131
Net income, surplus for the year.....	\$10,773
Passengers carried .....	203,411,809
Car mileage, miles.....	36,125,014
Earnings per car-mile.....	\$.2791
Expenses per car-mile (including taxes).....	.1552
Net earnings per car-mile .....	.1239

**REPORT ON MUNICIPAL OWNERSHIP**

The report of the committee of the American Street and Inter-urban Railway Association, rendered at the Columbus convention, has just been made public. It was presented by Charles D. Wyman (chairman), H. M. Sloan, J. J. Stanley, John A. Beeler and George F. Chapman. The report, slightly abstracted, follows:

Out of 164 companies received from our circular letter to members of the association we find that the franchises under which they are operating are derived as follows:

State .....	9
United States Government .....	1
City .....	44
City and State .....	36
Government and City .....	1
City and County .....	44
State, City and County .....	23
<b>Total .....</b>	<b>158</b>

The bearing of this mixed parentage with reference to a possible attempt on the part of cities to take over the business of the companies is obvious.

In answer to the question, "What municipality-owned utilities are now in operation in your city or field or operation?" 158 replies were received as follows:

None .....	58
Water Works .....	51
Electric Lighting .....	14
Water Works and Electric Lighting.....	21
Electric Lighting and Gas.....	1
Water Works and Gas .....	1
Water Works and Sewer .....	2
Water Works, Electric Lighting and Gas.....	4
Water Works, Electric Lighting, Gas, Sewer and Electric Railway .....	1
Water Works, Electric Lighting and Electric Railway....	1
Water Works, Electric Lighting and Sewer.....	1
Ferry .....	1
Bath Houses .....	1
Water Works, Ferry, Subways and Tunnel.....	1
<b>Total .....</b>	<b>158</b>

The municipal electric street railways reported in the above list are one in West Seattle, Wash., 1½ miles long with two cars, and the other in Guelph, Ont., with 7½ miles of track and operating eleven cars. Within the last month the electric railway at West Seattle has been sold to the Seattle Electric Company, a privately owned corporation.

One hundred and fifty-nine answers were received to the question, "Has there been any agitation in your locality for the municipal ownership of street railroad properties?" as follows:

No .....	132
Yes .....	6
Slight .....	21
<b>Total .....</b>	<b>159</b>

To the question, "What have been the causes of such agitation?" the companies apparently found difficulty in replying, since out of 164 only fifty-eight responded. Of these thirty-three asserted that there was no definite cause, and the others assigned as reasons, socialistic movements, the general municipal ownership wave in the country, political and newspaper agitation, and disagreements growing out of attempts at franchise renewal. One answer is worthy of attention, that received from the Guelph Company, in Ontario, Can., namely, "Public demand and failure of private corporation to make a success." It would be interesting to know whether the municipality was attaining any better financial results than those which led the private corporation to abandon the field.

In answer "To what extent does this movement prevail today?" seventy-five companies replied as follows:

No agitation at present .....	54
Slight .....	15
Growing .....	3
Active .....	3
<b>Total .....</b>	<b>75</b>

It is to be noted that of the three companies reporting active agitation, one is located in a city where municipal ownership

was made a political issue in a recent municipal election; in another, the movement grew out of a question as to the legality of the franchises under which the company was operating and the attempts on the part of the corporation to legalize and extend same, and the third is that of the municipally-owned plant at Guelph.

To the question as to the sentiment of the local press in regard to the movement, 116 companies answered that the movement was not receiving support by the newspapers, ten that it was advocated to some slight extent, and eight that the press in their vicinity was pronouncedly in favor of the doctrine.

One hundred and fourteen companies stated that the municipal ownership movement was not a feature in the politics of their city or town; two, that it entered into politics to some slight extent, while by six it was pronounced a prominent factor in the work of political organizations.

One hundred and thirty-one replies were received to the effect that there had been no expression regarding the doctrine in the voters or taxpayers of the city or county, one that it had been quite openly advocated and three that it had been made a subject of referendum.

To the question as to whether the city charters or any legislative enactment required a referendum of the question of the municipalities acquiring or owning and constructing street railways, out of 103 answers it appeared that about one-half of the municipalities or towns are required to refer such a question to the voters, and the others are free to take action as the civil authorities may desire, subject, of course, to general restrictions with reference to the issue of securities for municipal undertakings.

One hundred and thirty-two of the companies stated that there had at no time been any very complete discussion of the question of municipal ownership in their locality, and that no presentation of the arguments for or against the proposition had been made in the local press by any civic body or in any public assembly; while eight replied that the matter had been the subject of popular discussion. From Halifax, N. S., it was reported that the conclusion of a general and public consideration of the subject in that city had resulted adversely to its trial.

To the question, "Has your company made any public statements of its position, either in the papers or otherwise in regard to the question?" 132 companies replied "No" and three "Yes."

It will be interesting to note carefully the answers received to the following question: "What, in your opinion, is the best method of meeting and controverting the sentiment for municipal ownership?" Of the 110 replies, five methods were especially emphasized:

First—Education.

Second—Good service.

Third—Publicity as to facts of company's operation and position.

Fourth—A liberal policy in the matter of extensions, rates, etc.

Fifth—Square treatment of everybody.

From the above replies it is evident that as regards the electric street railroads in this country the movement for their municipalization has not as yet assumed any very grave proportions, but we cannot be blind to the fact that a strong sentiment in that direction has developed which will sooner or later threaten our investments and as well our rights as citizens and taxpayers, as we hold them. If we concede that this condition exists, the most important answer to the questions submitted to the companies would seem to be that last cited, namely, "What is the best method of meeting and opposing this sentiment of municipal ownership?" and we cannot do better than to take for discussion in this report the suggestion embodied in the replies received from the members of the association, which, in brief, is covered by the term "education" or the phrase "public enlightenment upon the subject."

We may utter only a truism when we say that he who would ascertain the truth or falsity of a proposition must needs as a precedent to any permanent and safe result be furnished with an open mind, an honest purpose and a courageous resolve. But such an attitude on our part is absolutely essential in the present instance, for if we believe that the discoverable truth as to this question of the municipal ownership of public and quasi-public utilities such as transportation, both as to facts, methods and results, will lead to the safeguarding of the business interests we represent and our own, as citizens and taxpayers, we ought heartily to urge our fellow citizens to join with us in a patient, comprehensive and honest study of the question and

the conditions which have given it life and force. Invective and violent declamation will not prevail to stop its progress; its promoters cannot be frightened from their purpose by superficial criticism or political strategy. We must meet them in the field of open discussion and argument, prepared to reason together honestly and fairly as to the merits of the proposition. "Will State or municipal socialism or ownership make for the greatest growth of the country, the municipality or the individual?" "Will it, under the conditions that prevail in this free land, contribute to the best profit of the community, both taxpayers and non-taxpayers?" "Is it right?" "Will it pay?" If in a proper spirit we can promote and join in discussion along such lines as these, we believe we will secure a most advantageous result to our interests as business men and citizens.

Your committee feel that to urge such action will be unavailing unless the members of this association are convinced of the necessity of the adoption of this or some kindred policy to avert positive danger to our interests. In the absence of any immediate attack upon our own domains we may be inclined to view the progress of municipal socialism with nothing more than dilettante curiosity and relegate its phenomena to the halls of academic discussion. While municipal socialism, which, as an important part of its creed advocates the ownership and operation of public utilities of the character our association represents, has not as yet made any very general or determined attack upon our business, it has nevertheless reached a status abroad and seeks a like one here both as a political dogma and a social theory which cannot in safety be ignored. However much we may be inclined to be indifferent to ideals, theories and captions, and refuse to be frightened by this bogey of socialism, we cannot shut our eyes to the fact that from Germany, France, Italy, Belgium and England it has come to America, has passed the inspection of many American scholars of civil policy and social economy who might be presumed to guard our intellectual and social gateway, and has found a lodgment in our country for the propagation and practice of its theories. It must be remembered that the theories of one age may become the facts of the next, and in this day of rapid movement in thought and action the ideals of one decade are incarnated in the political and social life of the next.

When equilibrium is delicately poised a minute and perhaps an unobserved change of a few ounces of weight may precipitate an avalanche, so in a society like ours, moving with unprecedented rapidity, unintelligent conservatism is dangerous, and in these days we cannot afford to be superficial observers of the progress of this socialistic question pregnant as it is for good or evil.

When from the platform of a great hall in the metropolis of this country, in the presence of 20,000 people gathered to do him honor and surrounded by men who rank as leaders in the field of politics and patriotic citizenship—men of high intelligence and noble purpose—the man whom a great political party hastens with almost universal accord to select as its candidate for the office of President of the United States, dares to declare as one of the principal features of his creed, "the ownership of the railroads by the Government," can we doubt that State socialism and with it that of municipalities is an active and progressive factor in American politics and life.

As a learned and accurate observer of the trend of modern events has said, "That man is living in a fool's paradise who does not see that we are drifting rapidly into socialism." Your committee conceive it, therefore, to be an essential part of this report to sound a note of warning to our fraternity that we are confronting an active and resourceful enemy and to urge that each of our members actively engage in a vigorous and determined campaign of opposition to this socialistic advance. We cannot refrain from expressing our belief that it is unfortunate to have this theory of State socialism adopted as a part of the creed of one of our great political parties, for this will insure for it a wider and more popular field for discussion than it has hitherto found in this country.

The more popular and usual reasons, aside from the general statement that corporations are acquiring too great control and political power, given by political orators and socialistic propagandists in support of the extension of municipal functions to cover water, light and transportation, are that these public utilities are natural monopolies, and as such belong to all the people for their use and convenience. The sanest and clearest statement made on this point we have seen is that of Samuel Chisholm, Lord Provost of Glasgow. He says: "In my opinion there are three conditions which should meet, or at least two

of which should meet, before a municipal corporation should be authorized to take over any public enterprise:

- "(1) That it is more or less practically a necessity.
- "(2) That it is practically a monopoly.
- "(3) That it requires the use of the streets."

The more radical promoters of the municipal movement refuse to be limited by the above conditions, and as one of these has said, insists there is no "finality to municipal enterprise." In this country thus far, however, the Lord Provost's definition covers some, at least, of the stock reasons given by the proponents of the doctrine.

But are these reasons well grounded? As to the element of necessity, is light or transportation any more a necessity to the people of a city than bread, clothes or boots? Why should the supplying of the latter be given over to private enterprise and the former be taken in hand by the city? As a learned jurist had said on this point, "These latter prime necessities of life are left to the ordinary law of supply and demand, and it is evident that the more imperious the demand the more certain will be the supply. That a thing is a necessity, so far from being a reason for its being supplied by the community, is a reason why it may safely be left to be supplied by private enterprise."

But these public utilities are natural monopolies and use the public streets. Is it true that our rights under charter in the cities of this country have protected us from competition? Do not the major portion of our franchises distinctly state they are not exclusive? Appeals to courts on the question of exclusive franchises have resulted in decisions to the effect that it is *ultra vires* for a Common Council to grant an exclusive privilege in a public street. Our critics argue, however, that our occupancy of a city street with our tracks prevents of necessity the incoming of a competing line. If one consults the maps of the cities of the United States, he will find that there are but few in which a competing line of street railroad could not find unoccupied streets upon which, from the centers of the business section to the residential quarters, a line might be laid with some fair degree of prospective profit. But a few years have elapsed since the present apostle of municipal ownership, his honor, Mayor of Cleveland, Tom Johnson, was granted a franchise in the streets of Buffalo for approximately 100 miles of track, and was only prevented from construction by the Railroad Commissioners of the State, who, after a careful investigation of the matter refused Mr. Johnson such a right on the ground the new road was uncalled for, as the local company was already giving all the service and facilities the city's needs required. Evidence of the presence of competition is to be seen in not a few of our cities to-day where applications are before the Councils for new and competing lines.

But if we are monopolizing the surface of the streets we cannot lay claim to the space above or below such streets, and neither in New York nor Chicago did the averred occupancy of the streets prevent the competition of elevated or subway lines, a kind of competition that is not far distant in many other cities.

Last of all we are exposed to the threatening competition of the cities themselves engaging in the business by the building of municipal lines, and with the strong arm of legislation compelling "joint user" clauses in any new extensions granted, giving them the right to run their cars over parts, at least, of our lines already built. Monopoly as defined by jurists exists when the law confers upon some object which is a matter of necessity or even of desire to others. In the light of this essential or certainly important feature of monopoly, the privileges, of which we have been made the grantees, cannot be dangerous, since the State or city has fixed the price at which we may sell our commodity, and further has reserved in almost all of our charters the right to regulate fares. We must operate whether the business is profitable or not, when general business conditions are favorable or the reverse, our sole privilege being that we may reduce fares by extending the length of the ride for a single fare, the enlargement of the transfer privileges and the carrying of an increasing number of city, county or State officials free.

But distrust of so-called exclusive proprietorship of public utilities lies, we are often told, in the belief that they are immensely profitable, and, therefore, that the State or municipality in granting charters for the private ownership and conduct of public utilities, have improperly parted with a valuable asset which they should in some way recover. This statement is notably the favorite allegation of agitators and demagogues, but it is as well a part of the faith of many people who have never

taken the time to study the matter with any degree of care or accuracy.

From the United States Census Bureau's special report on street and electric railways for 1902, some interesting and instructive statistics bearing on this matter of the value of our franchises may be obtained. By the report in question it appears that the total amount of dividends and interest actually going to stockholders and bondholders of the street and electric railways in the country, as a whole represents less than the current rate of interest on an amount equal to the face value of their outstanding securities. Of 817 operating companies in 1902 with 22,576 miles of track, and 60,290 cars carrying 4,774,211,904 fare passengers, but 286 paid any dividend on any or all classes of stock securities. The total ratio of dividends paid to total capital stock was 2.6 per cent; the ratio of total dividends to total dividend bearing stock was 5.1 per cent. The full amount of dividends paid during the year was \$33,039,171, and the same year the companies distributed in interest to bondholders and creditors \$46,462,470, paid to wage earners \$80,770,449, and to the Commonwealths in taxes \$13,366,335. If to this latter item be added the personal taxes assessed against the individual holders of street railway securities, on the low basis of three-quarters of 1 per cent on the face value of their securities, the item of taxes turned into the State and municipal treasury during the year amounts to approximately \$20,562,516. The rate of net return to stockholders would not indicate any especially great profit at present being derived from the chartered rights the companies possess, and the rate of return, considering the menaces and hazards of the business, surely cannot be regarded as excessive. It is notable as indicating the estimate of value placed upon street railroad securities that the stock issues of a comparatively few of the companies represented in this association sell at par. The bonds of our companies are not permitted as investments by savings banks, and in the list of investments by banks, trust companies and insurance companies, few, if any, street railroad securities are to be found.

To a statement of our dividend paying results, our municipal ownership friends may reply that our security issue is inflated, and thus good, divisible earnings are precluded. Meeting this allegation, we point to the facts as they appear in Massachusetts, an old and populous Commonwealth and one in which, by law, the security issue of a company must not exceed the actual cash invested. Everett W. Burdett, in his admirable recent address on municipal ownership, points out that "The State of Massachusetts has 98 electric railways, operating 2688 miles of track, transporting over 500,000,000 passengers by the use of 7341 cars, and that only about one-third of them paid a dividend in 1905. Sixty-three paid no dividends at all, while the other 35 paid from 2 to 10 per cent with an average dividend of  $4\frac{1}{2}$  per cent, which, if applied to the capital of all the companies in operation, would have yielded an average dividend of less than  $2\frac{1}{2}$  per cent. At the same time these companies paid into the public treasury in the form of taxes nearly \$2,000,000. It thus appears the tax gatherer, the employee and the general public have each and all reaped rewards much greater than have been realized by the stockholders in these enterprises." Verily the monopoly we enjoy is neither to be feared nor greatly to be envied.

Giving further consideration of this monopoly cry, we may point out that the great danger of monopoly is the absence of the stimulating and controlling power of competition. In the granting of our franchises, both the State and city authorities seemed to have this fear, for not only in these charters, but by ordinances of constant and regular sequence we are required to do this or that, or refrain from sundry and imaginary actions, with elaborate legal refinement. We are directed as to opening the streets, the kind of rails and crossings which shall be employed, the style of overhead construction we shall use, the kind of cars we may provide and how they shall be run, the signals to be used, the time to put on vestibules, when to take them off, where we shall stop to take on or let off passengers, the fare we may charge and the transfers we must give, how we must adapt our business to other users of the street; these and a hundred other regulations are duly set forth for our guidance. No other public utility is regulated and controlled to a similar extent. Nor do we complain of this careful and watchful supervision—a supervision the penal clause of which reads nullification of privileges or severe fines.

To turn over such a regulated and controlled monopoly to an uncontrolled one as would be the case were the city to assume the ownership and operation of its street railroads would, to put

it mildly, be open to great question. All the evils laid at the doors of monopoly of indifference to public wishes and comfort and the like, would surely be heightened and aggravated by such a transfer, and a little study of the usual conduct of public and municipal affairs would, we think, evoke a decided negative to the proposition, unless, we are sometimes promised, vital changes are made in the usual make up of municipal responsibility.

As to the point that as our roads in using the public streets thus trench on the proper sphere of municipal functions, we answer that as we construct our lines and operate them in accordance with and under the rule of the city's agents, the municipality could do no better.

We have thus briefly indicated a line of reply we believe can profitably be followed in our discussion of this question with those who take their cue from the socialistic utterances of public speakers and newspapers, whose stock in trade is the wholesale denunciation of monopoly and wealth.

We may now turn to those who advocate the municipalization of the street railroads for economic reasons or urge such an ownership will aid the laboring classes.

In the evidence given before a joint committee of the Houses of Lords and Commons appointed "to consider and report as to the principles which should govern powers given by bills to municipal authorities for industrial enterprises," Sir Thomas Hughes stated briefly what may be called the stock economic arguments for municipal ownership: (1) The obtaining of capital at a cheaper rate than can a private corporation. (2) The people become partners in the enterprise. (3) There are no dividends to pay. (4) Cheaper management. As a learned writer has said, advantages like these might be urged in the advocacy of all forms of municipal trading. If municipal trading has all these advantages over private enterprise and is, therefore, more efficient and productive, why should not these advantages be made use of for the better and cheaper supply of every article which the community needs? If of light and locomotion, why not bread and clothes? If the community as such possesses all these enormous advantages in cheapness and efficiency of production over the private trades, the logical result would seem to be that the community should possess itself of all the instruments and agencies of production and become the sole caterer for the wants of the citizen.

Evidently back of a program of municipal activity stands the question of taxes and their equalization in such way as that they shall bear justly upon the rich and the poor, the capitalist and the laborer, the professional man and the tradesman, with such equal weight that none may complain of his apportionment.

If the city, therefore, engages in a business for the service of which charge is to be made to users, and further, if this city business is instituted in the face of offers on the part of private corporations to assume all risk and under regulations by the proper authorities to give the service for a specific charge, justice to taxpayers and respect for fair business conditions demand that from the income of said business all charges should be paid. In other words, such business should be self-supporting, and this is manifestly true in consideration of the advantage which is claimed by the proponents of municipal ownership, that no dividends should be distributed by a municipally owned enterprise of any sort.

That such should be the basis of the financing of a city's remunerative public utilities is becoming generally recognized, and has been adopted in the case of municipal water works. The Mayor of Chicago, in his scheme for the municipal ownership of the street railroads of that city, proposes to issue bonds or certificates of indebtedness against the properties and their earnings and against these alone. The citizens of Seattle, Wash., were recently called upon to vote upon a scheme for the construction of a system of municipal street roads in that city. The financial basis of the proposition is set forth in the ordinance authorizing the same as follows: "To ratify or reject the proposition of incurring a general bond indebtedness bearing interest not exceeding 4 per cent per annum in the sum of \$1,272,000, together with the proposition of incurring a special bond indebtedness bearing interest not exceeding 5 per cent per annum in the sum of \$3,000,000, to be an obligation against not to exceed 20 per cent of the gross revenue or proceeds to be derived from the plan or system." This rather unique financial scheme, while it smacks very strongly of a municipality trading on margins, evidently recognizes the injustice, in part at least, of loading the general taxpayer of a city with the burden of a municipal public utility.

A city, therefore, establishing a business on such a basis has no

advantage over that of a private corporation in the matter of securing capital, and public service utility bonds and certificates of indebtedness secured by mortgage on the property and its revenues will not sell in the open market at any higher prices than those of a private corporation. In fact, we believe it can be demonstrated that capitalists, by reason of having less confidence in the progressiveness, accurate accounting and the skill of municipal management would regard less favorably such a security of a city road than they would that of a corporation.

As to the partnership of the people in the enterprise, it is but fair to say that the average man desires the liberty to choose for himself as to the investment of his money and business associates, and for every taxpayer in the city, whether he will or no, to be compelled to take shares in a business over which he has no control, and especially managed by men of whose capacity he has no proof, is a proposition which, while it may from a sentimental point of view have some force, surely from a business one is of no weight.

As it is a notorious fact that private enterprise is ambitious and progressive, ever seeking extension for its efforts and multiplying its activities, while business interests in the hands of the Government are quite the reverse in their policy, the suggestion that the municipalization of our street railroad systems would in the long run increase the opportunities for the working classes, is evidently untrue.

It is hardly necessary for us to take time to discuss the claim of the municipal ownership promoters that the city-owned road could be managed cheaper than is that of the private corporation; so universally is it acknowledged that public work of all kinds is less economically handled than that of corporations where responsibility is directly traceable and the directors or managers of which can be readily brought to book for negligence or incapacity.

As we have before stated in this report a considerable number of those advocating the municipal ownership of public utilities have been led to do so by their distrust and disgust at the relations which have existed between legislators having in their power the granting of public franchises, and the officials and promoters, or political bosses, who have acted as the henchmen of public service corporations. Your committee hold no brief for the defense of corporations who have debauched Councils, and by the use of bribes in the shape of securities or of cash have secured privileges, even though the request for such privileges in and of itself was often entirely proper. But we aver that graft is confined to no department, no locality, no party, no corporation or no individual. In the public revelations which have been made of late of the existence of this evil in this country, it appears in the Federal government, in the city governments, in the post office department at home and in the consular service abroad, in public and private business circles; and wherever it is seen it is revolting to honest business enterprise, and injurious in the extreme to all our interests and desires. It is an evil which must be extirpated, or reduced at least to its lowest terms, and we believe we may say that no class of business men or business interests would be more pleased to see this evil uprooted than would the street railroad companies, their managers and directors. If the inner history of the companies represented by this association could be accurately written and spread in full upon the public books, it would cover a list of refusals to purchase privileges, or rather, in many instances, permission to do that which was altogether advantageous to the city in which the company operated and to the people whom it desired to serve, even at the risk of attack, misunderstanding and unpopularity, that would be surprising in number, and well nigh continuous. We go farther and aver that the street railroad companies of the country, as a body, are honestly conducting their enterprises. They have no reason to be ashamed of the business in which they are engaged, or of the service which they give. They have played no unimportant part in the wonderful growth of urban life and opportunities in this country during the past twenty-five years, and what they have accomplished in the introduction of electricity and its uses for public transportation is a source of pride and of self-congratulation. The use of improper or underhanded methods in the securing of rights or the enforcement of privileges already granted is as distasteful to the street railroad manager as it is to any citizen or business man; and we are sure that we will join hands most gladly in every movement looking toward the extirpation of such a practice of evil.

But it has been done no more by the street railroads in proportion to opportunities offered, than by the private individual

who pays the policeman on his beat for protection, or the laborer who contributes to the political boss to obtain work.

Since this graft practice seems to have infiltrated itself through all departments of political and private business life, we respectfully submit that the municipalizing of public utilities in a city presents a most inadequate method of reformation. There is no way to make the community honest except by individual honesty, and the American conscience is not dead, if it does sometimes seem to nod. A general appeal to the common honesty of the country, which has been made so effectively by men like Folk in Missouri, Taft in Ohio, Weaver in Philadelphia, and Jerome in New York, will have far greater effect than to place in the hands of public officials of cities, who have already shown a weakened sense of right, truth and honor, the management and control of great public utilities. It certainly would be a sad reversal of the commendation addressed so long ago to the faithful steward, "Thou hast been faithful over a few things, I will make thee ruler over many things," to adopt such a policy with officials in our cities until at least a very great change in the political makeup of Councils and legislative bodies had been brought about.

We cannot in this connection refrain from asserting that into the ambitions of public corporations there enters an element which we might call "the passion to serve," a strongly moving desire to secure honor and reputation in the eyes of our fellow citizens to a far greater extent than our critics will generally admit. The corporation and its managers are described as without soul, wholly sordid and greedy, the scope of whose work is limited by the goal of wealth and the distribution of large dividends. Is it entirely true that the financial leaders in the country, or the captains of industry, have no care for their duties as citizens, or no other object in their work than that of accumulation? We believe that with as much truth it might be asserted that the college professor cares nothing for his teaching other than that he receives his salary, or that the inventor is spurred to his task solely by the prospect of gain, or that the soldier fights in defense of his country under the impulse only of possible booty. In times of sore financial distress, in the face of great calamities occurring in any part of the country, or in any great political crisis, is it true that the corporate wealth or the individually prosperous exhibit a want of participation in the popular humanitarianism of their fellows? When the earthquake and fire recently overwhelmed San Francisco, were we not all, rich and poor, included in the common feeling of sympathy and of substantial help to the suffering and the needy? If individual effort contributes to the development of a man industrially, and to the strengthening of his mental powers, we refuse to believe that it shrivels his soul or narrows his conception of righteousness and truth.

As we have said, in the effort to reach a higher standard of industrial and civic honesty, our companies will most gladly join. Perhaps it may be presumptuous in us to point out to publicists methods to this end, but we cannot refrain from expressing, from our point of view, our satisfaction with the plan which has been during the last two or three years adopted by the cities of Houston and Galveston. The chief feature of this is the concentration of municipal power in the hands of the Mayor and four commissioners, who act as his assistants and who combinedly have a certain degree of checking power on the Mayor's action, but only in a few specified matters, mainly relating to expenditures. This new form of government, as you will remember, was established by a charter granted by the Legislature, and the idea was in part inspired by the effective methods of the commission under which the city of Galveston had spent millions for improvements and the re-establishment of all that had been destroyed by the great flood. Only four city officials are chosen by popular vote—the Mayor and four aldermen-at-large—who are at once appointed by the Mayor commissioners respectively of taxes and finance; police, fire and electricity; streets and bridges; sewers, parks, water and public health. Mark you, these aldermen come not from any individual ward; they represent presumably the interests of the city at large. The Mayor has the removal of all non-elected officials and employees, including the tax collector, the chief of police, the judge of the corporation court, the city attorney and the city comptroller. A referendum upon the granting of a franchise may be had whenever 500 qualified voters ask for it. Thus the municipal government exhibits a combination of home rule and direct responsibility.

Without dwelling upon this experiment, it suffices to say that

its working has been excellent. The street railroad corporations in both cities report that under such rule their requests are respectfully considered, and they feel that the decision in respect to same is one dictated by an independent and civic study of the situation, viewed in its entirety.

We may refer also to the fact that in the District of Columbia, where commissioners have charge of public affairs, no suggestion of municipal ownership of street railroads has ever been made.

The assertion that municipalities already provided with a corps of officials in the various departments can take over the construction and management of such public utilities as water, light and transportation, and distribute the official duties involved in the care and direction of same in such a way as to cheapen the costs of management as compared with those of private control, is one that can best be refuted by a comparison of the costs of work done by city employees along almost any line, as compared with that of individuals or private corporations. Apart from the question of the quality of the city accomplishment and that of the individual constructor or manager, it can be easily demonstrated that the element of political influence entering into the choice of municipal officials and employees, the pressure exerted by political leaders for places for their partisans, the conduct of business by committees and boards without any accurate line of responsibility and without the presence of personal ambition in the officials to do business on a business basis, always makes against economy and efficiency. One has but to read the public records of Common Councils to be struck with the constant appeals from the various departments of any city for more help, and the usual answer made to a complaining citizen of some lack of attention to prescribed duties by city employees, is that there is lacking sufficient force to secure a proper compliance with public requirements. The truth is that a high grade of specialized intelligence is not to be found in our municipal governments, shifting and uncertain as their makeup is, and no civil service legislation can cure this evil. It inevitably follows from such a condition that work done by a city is always at a higher unit cost than that performed by private corporations or individuals.

There are still other good and substantial reasons which may be effectively advanced in support of the private installation and conduct, under proper control, of quasi-public utilities.

Can it be doubted that where a city has invested the money of taxpayers in a municipal plant like a lighting or street railroad enterprise, that part of its functions assumes the character of a guarded monopoly that jealously resents any invasion of its field of competition or new methods or improvements.

In the light of this inevitable result it may be interesting to conjecture what would have been the effect upon the urban transportation problem in the United States, if, when electricity knocked at our cities' gates twenty-five years ago and offered itself as a substitute for horse power in the moving of tram cars, our municipalities had been the investing owners in the then operating roads. It has been estimated by statisticians that the electrification of the horse railroad systems of this country has involved the sacrifice of above \$250,000,000 worth of property and the expenditure of a much larger sum for new construction and equipment. Is it presumable for a moment that such a loss and such a new investment would have been entered upon with anything like alacrity and courage? Would not that venturesome spirit which always inspires and accompanies the initiation and permanent introduction of any such great industrial improvement have been conspicuously absent? Secure against competitors, it seems to us certain that the municipal monopolists, after long public discussion and delay had been had, would have thrown the question into the arena of politics to be wrangled over by radicals and conservatives, holding in check thereby the growth and development of the cities to a most harmful extent. The history of electrical enterprises in England bears out such a conclusion. It appears from abundant evidence presented to the commission of the British Parliament appointed to investigate municipal trading, that city after city had successfully opposed the introduction of electric lighting or electric traction, either because they were themselves interested in gas or horse tramways, or because they intended at some time or other to become suppliers of electric power themselves and wished to keep the field clear.

The private company is urged constantly to better service, to improved apparatus, not only by its desire to please its patrons, upon whom its revenues depend, but by threatened invasion of its territory by others who will offer greater inducements to

users of its commodities. No such stimulating motive can be present in a municipal monopoly. Such a kind of monopoly encourages slackness in management, persistence in obsolete methods and resistance to new inventions. In the very nature of the case, unwillingness to admit mistakes, the danger of criticism on the part of the special party promoting the municipal enterprise, the endeavor to avoid public investigation—all these follow most naturally in the train of municipal monopoly. But a few days ago a turbine in a municipal lighting plant in one of our large cities burned out. The officials hastened to the private company also operating in the city for help, and this was most willingly granted, but not a single paper in the city published a word of the accident in the municipal plant. No investigation was held, at least no public statement was made, and it is believed that few, if any, of the citizens were aware of the fact of the destruction of this costly machine and the added expense thereby entailed upon the taxpayers. It is needless for us to point out that under such a condition the accounting statements of many of the municipal light and water plants in this country are looked upon with suspicion, and one of the questions discussed by the municipal league of cities in this country has been the obvious necessity of a better system of accounting, so that the costs should be accurately apportioned and ascertained against any municipal function.

Another very pertinent objection to municipal ownership lies in the fact that a municipality necessarily moves slowly and is unwieldy. These are the days of hot-foot progression, decisions must be made with rapidity and promptness. A municipal monopoly which must in advance secure the judgment of its stockholders and directors as to the wisdom of adopting any proposed invention or the selection of some new course, would find itself hampered in the matter of speed and would, without doubt, be very timid and nervous in entering upon any new policy. The honest official, knowing that he is the trustee of the public funds, would feel that he had no right to enter upon speculative undertakings, and as the incorporating in our work of many of the inventions applicable to our special industry is necessarily experimental, and therefore speculative, the public administrator, facing the responsibility of this trusteeship and fearful as to the security of his position, would hesitate to recommend the scrapping of old and the purchase of new and up-to-date apparatus, often to a degree which would necessarily impede the efficiency and progress of the municipal plant. It is fair to say that, so far as we know, either abroad or in this country, in cases where municipalities have engaged in lighting or tramway work, there is no record of a new invention having been taken up and carried to a success through city initiative or practice.

The general effect of the taking over by the State or by the city of public utilities would, it cannot be doubted, most seriously injure and discourage private enterprise; and if no other objection were raised against municipal trading, this should be in this day and age of the world a well nigh conclusive one. Join to this the question of cost to the cities and of the doubtful profit resulting therefrom, and we have a presentment against the scheme of the strongest character. As we have said, the question of taxes lies at the base of all municipal activity, and one has but to read of the increasing debt of most of our cities and the upward tendency of taxation in the majority of our municipalities, to be convinced that it certainly is unwise for the urban centers, with the rapid extension of their municipal needs, to undertake any increased financial burdens unless absolutely necessary. As it can be shown that the majority of electric railway companies, in the shape of taxes in some form and in the returns made by individual stockholders, are paying into the treasuries of State, county and city a sum practically equal to, or greater than, that distributed to their own stockholders, the argument against municipal investment in public utility enterprises is very plain.

We may with very great benefit turn to the condition in England in this matter of taxes as bearing on the point we are discussing. In the month of August the special correspondent of one of our American newspapers writes regarding this subject as follows: "It is of this burden that we hear little in America. The student of municipal trading writes of the efficiency of the British street cars, lighting plants and the rest. He speaks truly of the honesty with which these enterprises are conducted. The philanthropist speaks warmly of the extent and liberality of the British system of poor relief, and the altruists applaud the measures of social reform. But to hear the other side, the in-

quirer must know, not city councilors displaying their city to the admiring stranger, not ardent philanthropists, and not those who study social reforms that benefit one class in the community above the cost it lays upon others. We must go to the houses and life of the taxpayers that meet the expenses of these things. The very rich may well bear the increasing charge that steadily-rising taxation lays upon them; not upon them, but upon the middle class from the well-to-do professional man who works with his brain harder and longer than the laborer, down to the small tradesman struggling to keep his independence, does the real burden fall. Seven years ago taxation in England stood at little more than \$6 per head; four years ago it had risen nearly to \$7. There are no statistics for later years, but there is every apparent reason to believe that the amount of taxation has continued to rise. Local associations for taxpayers' defense are springing into existence in many cities and towns. The class that must pay for municipal experiments and altruistic ventures in general is beginning to stir from its indifference to local administration and local elections. Our burden of taxation increases until it is becoming intolerable."

A reaction in the matter of municipal enterprise is taking place in England, and in our own country taxpayers are beginning to inquire in an emphatic way as to the actual results of our own municipal enterprises. Bad bookkeeping and inadequate reports are too often the rule in the case of city plants, but expert examinations of these business ventures are now more frequently demanded, and they are summoned to the bar of public opinion to give testimony as to their profitableness and efficiency. The verdict most frequently rendered against them is that they are uneconomical and antiquated in apparatus and method.

From New York City, Brooklyn, Cincinnati, Chicago and Seattle, waste in output, inadequate supply and laxity of management is alleged by users against the municipal water systems, and the expert investigation of city gas and electric installations by competent commissions and experts on behalf of many of our cities, are resulting in like conclusions. We may cite two typical cases:

A special commission of the Council of Richmond, Va., after a thorough examination of the municipal gas plant of that city, recently reported that the capacity of the works was insufficient, the apparatus worn out and obsolete, the labor paid more than the market price and the care and conduct of the plant unskillful, and finally recommended the operation of the work be transferred to a private corporation. "The Richmond Despatch," commenting on the service given by the city plant, says: "Municipal monopoly is more autocratic and overbearing than any private corporation would dare to be."

Hamilton, Ohio, has often been referred to by municipal ownership advocates as an example of their theory worthy of imitation. It is the only city in the United States of above 25,000 population that has built and operated its own water works, gas and electric light plants. These plants have been in operation twenty-two, sixteen and ten years, respectively, and thus offer a fair basis for gaging the efficiency of municipal operation. On March 9 last, a report on the financial condition of these plants was filed by a special examiner of the State Bureau of Inspection and Supervision of Public Offices, from which it appears that, considering operating expenses alone, the gas and electric light works incurred losses for the three years ending December 31, 1905, of \$16,689 and \$4,426, while the water works showed a profit on paper of \$12,797, with a proper allowance for interest, insurance, depreciation and lost taxes, the aggregate loss of the three years exceeds \$230,000. It is to be added that the municipal gas plant of Hamilton has been shut down.

Such illustrations of the real results of municipal ownership and operation cannot but be effective with the thoughtful and unprejudiced in our cities, upon whom must fall the burden of paying for these business enterprises, and as has been said, "With the facts in their possession the common sense of the American people will not permit such a movement to overwhelm our cities with debt, as is the case in England."

As the exploitation of municipal tramways in this country is confined to two or three comparatively small ventures, and these moreover have been operating too short a time as to give little value to results obtained, we have at hand little or no actual data of use in determining what the financial results or general value of such sort of enterprises would be under our municipal conditions. It is customary for the advocates of the movement to point to municipal trading as practiced abroad, especially in

Great Britain, as illustrative of the benefits they assure the people of this country would accrue to them if our cities would become the owners and operators of urban transit. Until recently the facts of municipal trading abroad have excited but little interest in the general public here, and to take the time to find out the real truth as to the results across the water, of municipal street railroad enterprises or other municipal ventures, has apparently been deemed unnecessary. As Mr. Burdett, in his recent admirable address before the National Electric Light Association, said: "There have been few serious efforts made to counteract the assertions of partisans of municipal ownership, misrepresentation of facts and statements of false conclusions from insufficient or inaccurate data have gone without challenge."

Happily we are no longer in doubt as to the truth of municipal results abroad, and can measure these by practical standards. We are not obliged to confine ourselves in our discussion of the subject to theories or ideals, for we have before us the results of the investigation of foreign municipal ventures by students of practical conditions whose conclusions cannot be gainsaid.

Principal among these, we find ourselves specially indebted to Everett W. Burdett, of Boston, whose intimate knowledge of the work of public service corporations in this country has made him familiar with the character of service here demanded, and whose legally trained mind gives him a peculiar aptness for the analysis and judicial balancing of arguments and practical results. Mr. Burdett, after spending some time in England in careful study of the object, has given us the best brief presentation in the matter which has yet appeared, bristling as it is with cold, hard facts. We commend to your careful reading his article recently appearing in the "Journal of Political Economy" on "Municipal Ownership in England."

Prof. Hugo Richard Meyer's volume on "Municipal Ownership in Great Britain," published this year, might well be used by us as a text book, for in its pages full of statistics and data of all kinds, the theory, development and actual results of municipal ownership and operation, with especial reference to tramways, are set forth in a masterly and convincing manner. The literature upon this subject is fast multiplying in answer to the public demand for the facts, and we urge upon our members a careful reading of these various publications.

The report of James Dalrymple, head of the municipal tramway system of Glasgow, who recently visited this country in the capacity of a municipal ownership expert, to advise his honor, Mayor Dunne, of Chicago, as to the establishment of that kind of a street railroad system in that city, is the utterance of an experienced street railroad manager, and one whose conclusions can certainly be regarded as unbiased by any leaning toward the private ownership of street railroad systems. When such an expert, after a study of the conditions surrounding urban transit work in Chicago and other cities, reports adversely to the municipality taking over the transportation business, we may accept his conclusion as far better founded than that of the political demagogue or the idealistic doctrinaire.

The limits of this report will not permit its inclusion of the facts and figures the students of results abroad have presented in the publications to which we have called your attention. We have already alluded to some of them, and their meaning to us as against the movement for municipal ownership.

In brief, their findings are that the development of street transportation facilities abroad has been static and miserably slow as compared with that in our country. That the extent and quality of service given is much behind that given by our private companies. That in actual return to the public treasuries the amount per capita of population is less on the part of the municipal tramways than that rendered here by private corporations in taxes, interest and other contributions; and, finally, that the political combination of a mass of municipal employees might be destructive to the best government of a city.

To the political aspect of this question we need hardly call your attention. Our cities have during the last few years arisen in revolt against the political boss, and the dethronement of such a ruler has been gladly applauded by all right-minded citizens. Could any surer method of returning such a one to dangerous power be devised than to bind together in one federation of selfish interest the number of employees which are of necessity required to operate a city street railroad system, and who, if under municipal rule, would look to the political control of the municipality for place and pay?

The conclusions evoked by a careful study of municipal owner-



ship abroad and which we have very briefly adverted to above, may well be carefully studied and verified by the membership of this association, and in our efforts to bring to pass a more general enlightenment upon the essential facts and results of this subject, we will do well to invite discussion on these points.

A word or two regarding our legal status. Having received grants from State, county or city, many of our companies are inclined to feel that their strongest bulwark against the encroachments of municipal or State competition lies in what they are pleased to term their vested rights. It is true that the equity of the case is with us, and that an attempted confiscation of our property and privileges by legislative assemblies or municipal councils might be successfully resisted on moral and equitable grounds. But we must remember that the source of our legal rights lies largely in legislative action, and that within the limits of the constitution absolute confiscation of our property is possible. As a legal authority has said, "In theory we deny that confiscation occurs under our laws, but in fact confiscation forms a regular branch of our jurisprudence which the court undertakes to supervise. The most superficial acquaintance with history suffices to convince the reader that property which is obnoxious and ill-defended is generally confiscated, and if such property escapes confiscation it is because of the vigor with which attack is repelled. Private property is rarely respected when the property is for some reason unpopular, and the possessors thereof feeble relatively to the prejudice against them."

If the actual confiscation of our property can be resisted through legal means, its taxation to such an extent as to make it valueless is largely in the control of the public.

It remains to add that not alone by argument and discussion may we defend our property interests from municipal ownership encroachment, but as well it is of imperative necessity that in the general policy of our management we gain the good will of those we serve. The motto of a merchant prince, "The customer in this store is always right," might well be ours in the daily conduct of our business. "He who serves the public best serves his company best," speaks a sentiment which must be an animating principle of our management.

Insisting upon our rights as property owners and taxpayers, conducting, under control and with a due sense of responsibility, an honorable business, and claiming the rewards which individual initiative effort and ambition fairly bestow upon us, we must at the same time have a clear preception of and respect for the rights of others, and in all our dealings with the public remember we are its servants and not its masters.

## THE CLEVELAND SITUATION

The Cleveland Electric Railway Company has spent the week in tearing up its track on Quincy Street, one of the two from which it was barred by the United States Supreme Court injunction, and the paving is being replaced just as it was before the street was used. In all, there are about 10 miles of track in Central Avenue and Quincy Street, and it is said that the property is worth, upon the basis of valuation given during the leasing negotiations, \$750,000, after the salvage has been deducted. This is the property for which the low-fare companies offered \$150,000. Judge Phillips heard the original injunction suit to prevent the Forest City Railway Company from building lines on Central Avenue and Quincy Street, and to prevent the Low Fare Railway Company from using or interfering with the Cleveland Electric's tracks. The decision will be rendered later. In the meantime, however, the Low Fare Railway Company, operating under the franchise rushed through a week ago and the special permit granted by the Board of Public Service, undertook to lay track on Central Avenue and Quincy Street, where the old company had cleared the way by removal of its tracks. On Thursday, Charles S. Isom, a property owner, applied for an injunction against the company to prevent further construction, on the ground that the ordinance had not been published and that the company had not the consents of property owners when the ordinance was rushed through the Council. The Cleveland Electric had secured the revocation of the consents of a large number of property owners, but the legislative body of the city paid little attention to that. Squire, Sanders & Dempsey, attorneys for the Cleveland Electric, gave notice that this suit would be brought and they secured a continuance of the temporary restraining order until this week. The attorneys for the Low Fare Company endeavored to have it dismissed, pending a hearing on the ap-

plication for a permanent injunction, on the excuse that they could save the old company the expense of replacing the pavement by laying track along close behind the wrecking force. The court could not see it in that way.

Under the permit given by the City Council and the Board of Public Service the Low Fare Company also endeavored to connect its track at East Fourteenth Street with the Cleveland Electric tracks on Euclid Avenue, against which action an injunction is pending. Judge Chapman, who is hearing the other injunction cases, ordered the work stopped at once and rebuked City Solicitor Baker for advising such action. He also said that he would take up the question of contempt later on.

The new companies are now endeavoring to obtain consents of property owners on streets connecting Central Avenue and Quincy Street east of Fifty-Fifth Street. It is said that the companies are planning to use the tracks of the Cleveland Electric on Fifty-Fifth Street, under condemnation proceedings, but that failing they desire to have a clear way through on some other street. The Cleveland Electric, however, hopes to prevent the granting of consents until the people are thoroughly acquainted with the situation.

The Cleveland Electric Railway Company has refused to pave between tracks on Detroit Street, between West Fifty-Eighth Street and West 117th Street, as had been planned, since the administration has declared that its franchise on that street expires next February. The cost would be something like \$70,000, and the company does not care to throw that amount away.

The Cleveland Electric Railway Company is carrying about 120,000,000 passengers a year. At the present rate of fare it gets 4.7 cents per passenger. The expense per passenger is 2.82 cents. With the proposed reduction to seven tickets for a quarter, the rate would be 3.6 cents, or a loss of 1.1. Computed in this way the direct loss would be \$1,320,000 per year. The net profit per passenger is .78, and on the basis of 120,000,000 passengers a year, the net income of the company would be \$936,000. The bonded debt of the company is \$10,000,000, and 5 per cent on this would be \$500,000, leaving \$436,000 to pay dividends on the stock, which is 2 per cent or less.

Judge Chapman on Saturday issued an injunction against the Forest City Railway Company, to restrain it from building a street railway system on Central Avenue and Quincy Street. He held that the financial interest of the Mayor in the company nullified its right to franchises on those streets. The Low Fare Railway Company was also enjoined from using the tracks of the Cleveland Electric. The court said that the defense that the public would be inconvenienced by the fact that there are street car lines on those streets is not sufficient to debar the company retaining possession of its own tracks and other property, nor is it sufficient to allow another company to take possession of property that does not belong to it and operate the property because people are inconvenienced. In other words, the private property rights of the Cleveland Electric must not be violated.

Monday evening the City Council passed franchise extension ordinances giving the Low Fare Company grants on the following streets, now occupied by the Cleveland Electric Railway Company, whose rights are claimed to expire next February: Woodland Avenue S. E., Kinsman Road S. E., Detroit Avenue N. W., Lorain Avenue, Bridge Avenue N. W., West Sixty-Fifth Street, Clark Avenue S. W., West Seventy-Third Street, Madison Avenue N. W., West Ninety-Eighth Street, Woodbine Avenue N. W., and John Avenue N. W. These routes are all on the West Side. Fifteen ordinances were introduced granting the Low Fare Railway Company franchises on as many streets between Central Avenue and Quincy Street east of Fifty-Fifth Street. It is said this was done in order to keep the Cleveland Electric in ignorance of the street that would be used.

Councilman Felton introduced another ordinance granting the Cleveland Electric a franchise on Central Avenue and Quincy Street, at 5 cents cash fare and seven tickets for a quarter, but the matter was tabled in spite of his efforts to have it advanced to a second reading, as has been done with the low-fare ordinances. Councilmen do not want to put themselves on record with their votes.

This week the suits against the Low Fare Railway Company will be taken up. The allegation is that the franchise granted it is illegal, because it did not have the consents of property owners along the streets. The Cleveland Electric had obtained the revocation of a large number of consents, sufficient to prevent the company from securing a valid franchise it is claimed.

## FIFTH ANNUAL REPORT OF THE UNITED RAILWAYS INVESTMENT COMPANY

The fifth annual report of the United Railways Investment Company, which was presented to the stockholders at their meeting last month, as referred to before in the STREET RAILWAY JOURNAL, gives the separate earnings of the United Railways of San Francisco, the Philadelphia Company and affiliated corporations and the combined earnings. The operating figures and balance sheet, together with the remarks of President Thalmann, abstracted, follow:

During the year 1906 your company acquired \$24,200,000 (par value) of the common capital stock of the Philadelphia Company, an amount which is approximately 72.8 of the outstanding common capital stock of that company.

Of the stock so acquired \$21,000,000 (par value) was deposited by stockholders of the common stock of the Philadelphia Company under the plan and proposition ratified at a meeting of stockholders of your company, held April 5, 1906, and the purchase price therefor was duly paid by your company at the times and in the manner provided for in said plan and proposition, and the shares so acquired were duly pledged and deposited under the collateral trust agreement securing 5 per cent prior lien collateral trust bonds of your company, as required by said plan and proposition.

The residue of such common capital stock, amounting to \$3,200,000 (par value), was acquired later in the year, and of that amount \$2,690,000 had been delivered to your company and paid for by it prior to Dec. 31, 1906, and the balance, amounting to \$510,000, was delivered to your company and paid for by it in January, 1907.

### COMBINED INCOME ACCOUNT OF UNITED RAILROADS OF SAN FRANCISCO AND PHILADELPHIA COMPANY AND AFFILIATED CORPORATIONS, FOR THE YEAR ENDED DEC. 31, 1906

	Total	United Railroads of San Francisco	Philadelphia Company and of Affiliated Corporations
Gross earnings .....	\$23,785,596.39	\$5,955,786.32	\$17,829,810.07
Operating expenses and taxes.....	12,381,067.22	3,114,590.09	9,266,477.13
Net earnings .....	\$11,404,529.17	\$2,841,196.23	\$8,563,332.94
Other income .....	289,429.80	89,360.84	200,068.96
Gross income .....	\$11,693,958.97	\$2,930,557.07	\$8,763,401.90
Deductions from income (not including fixed charges).....	1,333,944.14	37,231.13	1,296,713.01
Income applicable to fixed charges, etc. ....	\$10,360,014.83	\$2,893,325.94	\$7,466,688.89
Fixed charges .....	4,880,456.12	1,580,702.14	3,299,753.98
Net income .....	\$5,479,558.71	\$1,312,623.80	\$4,166,934.91
Improvements, betterments, extensions, sinking funds, etc..	1,595,627.78	435,477.82	1,160,149.96
Net income after deducting improvements, betterments, etc.	\$3,883,930.93	\$877,145.98	\$3,006,784.95
Dividends on preferred stock:			
Philadelphia Company.....	\$299,997.50	.....	\$299,997.50
Equitable Gas Company....	3,201.00	.....	3,201.00
Consolidated Gas Company.	28,333.33	.....	28,333.33
Total .....	\$331,531.83	.....	\$331,531.83
Surplus for the year applicable to dividends on common stock, etc. ....	\$3,552,399.10	\$877,145.98	\$2,675,253.12
Proportion applicable to other owners of common stock of affiliated corporations .....	3,783.65	.....	3,783.65
Balance .....	\$3,548,615.45	\$877,145.98	\$2,671,469.47
Proportion applicable to United Railways Investment Company, based on its present stock holdings .....	\$2,821,975.75	\$877,145.98	\$1,944,829.77
		100%	72.80%

New York, April 16, 1907.

During the current year the Philadelphia Company has paid the regular dividend on its preferred stock and the usual dividend of 6 per cent on its common stock, and all the surplus earnings of that company, above the amount of dividends, has been retained by that company for its corporate purposes.

Both the gross and net earnings of the United Railroads of San Francisco had shown excellent results up to April 18, 1906. On that date the earthquake occurred, which resulted in a disastrous fire and involved the company in great loss, which included the destruction of the cable power houses and severe injury to the cable conduits.

That company reports that it has now installed the overhead trolley system on practically all the important roads formerly operated by cable, and that over 91 per cent of the mileage of the company is now in operation.

In connection with plans intended to provide the United Railroads of San Francisco with moneys to be required by it in the future for construction and improvements, authority has been given by the directors of your company to vote the stock holdings of this company in the United Railroads of San Francisco in favor of a proposal to increase the capital stock of that company by the creation of an issue of \$5,000,000 of first preferred stock, the same to bear interest at the rate of not less than 6 per cent per annum, and to be cumulative. Of this issue of first preferred stock \$1,500,000 is presently issuable, and your directors have authorized a subscription thereto by your company, at par, for cash.

The audit of the accounts of the United Railroads of San Francisco for its fiscal year ended Dec. 31, 1906, and of the Philadelphia Company for its fiscal year ended March 31, 1907, have not been completed. Messrs. Haskins & Sells, however, have prepared a tabulated statement of the consolidated gross earnings, operating expenses, taxes, interest charges, net income, dividends and surplus of the Philadelphia Company and the United Railroads of San Francisco, for the calendar year 1906. For the reasons stated, with respect to the annual reports of the two companies, the figures for the year 1906 are in part based on the provisional figures of the accountants.

No cash dividends were paid during the year 1906 by the United Railroads of San Francisco, all its receipts over and above fixed charges and taxes and all the surplus earnings of the Philadelphia Company, above the amount of dividends paid by it, having been retained by the respective companies for their respective corporate purposes.

### UNITED RAILWAYS INVESTMENT COMPANY GENERAL BALANCE SHEET—DEC. 31, 1906

ASSETS	
Investments:	
United Railroads of San Francisco stock:	
200,000 shares preferred, \$100 par value each,	
199,989 shares common, \$100 par value each.	
Philadelphia Company stock:	
473,800 shares common, \$50 par value each.	\$53,052,818.40
Other investments .....	73,663.21
Total investments .....	\$53,126,481.71
Cash:	
New York bankers.....	\$2,665.74
Philadelphia bankers .....	5,000.00
On deposit to pay bond interest.....	4,616.90
Total cash .....	12,282.64
Demand loans .....	276,725.00
United Railroads of San Francisco dividend certificates:	
Bearing interest at 6 per cent.....	\$150,000.00
Bearing interest at 5 per cent.....	400,000.00
Total United Railroads of San Francisco dividend certificates .....	550,000.00
Interest accrued:	
On demand loans.....	\$1,921.56
On United Railroads of San Francisco dividend certificates .....	3,758.33
Total interest accrued.....	5,679.89
Two months' proportion of dividend of 1½ per cent on capital stock of Philadelphia Company, declared Nov. 23, 1906, and payable Feb. 1, 1907.....	236,900.00
Furniture and fixtures.....	624.25
Contingent asset—amount due from United Railroads of San Francisco and Philadelphia Company—subject to adjustment .....	103,471.97
Total assets .....	\$54,312,165.46

Note.—At Dec. 31, 1906, the United Railways Investment Company had a contingent liability to an amount not exceeding \$500,000, for accounts of the United Railroads of San Francisco, which it has guaranteed.

The dividends on the \$20,000,000 preferred stock of the United Railroads of San Francisco are cumulative, and are in arrears as from March 31, 1906.

UNITED RAILWAYS INVESTMENT COMPANY GENERAL  
BALANCE SHEET—DEC. 31, 1906

LIABILITIES	
Preferred capital stock—150,000 shares, par value \$100 each...	\$15,000,000.00
Common capital stock—194,000 shares, par value \$100 each...	19,400,000.00
Collateral Trust, sinking fund, 5 per cent gold bonds.....	15,750,000.00
Preferred stock dividend certificates:	
Bearing interest at 6 per cent.....	\$712,500.00
Bearing interest at 5 per cent.....	375,000.00
Total preferred stock dividend certificates.....	1,087,500.00
Preferred stock dividend, payable Jan. 2, 1907, in 5 per cent scrip .....	375,000.00
Cash overdraft—New York bankers.....	\$487,027.38
Notes payable .....	1,000,000.00
Drawn under European credits.....	603,875.00
	*2,090,902.38
United Railroads of San Francisco—current account.....	48,103.77
Vouchers payable .....	42.35
Bond coupons due—not presented.....	4,616.90
Interest accrued:	
On bonds .....	\$131,250.00
On dividend certificates.....	16,501.21
On notes payable.....	8,916.68
On European credits.....	2,549.67
Total interest accrued.....	159,217.56
Profit and loss—surplus.....	396,782.50
Total liabilities .....	\$54,312,165.46

\* This indebtedness had, prior to April 16, 1907, been reduced to approximately \$135,000.

UNITED RAILWAYS INVESTMENT COMPANY, STATEMENT  
OF INCOME AND PROFIT AND LOSS, AS CERTIFIED BY  
HASKINS & SELLS, FOR THE YEAR ENDED DEC. 31, 1906

Income:	
Dividends on stocks owned.....	\$1,295,397.83
Interest on loans, dividend certificates, etc..	38,824.80
Total .....	\$1,334,222.63
General Expenses:	
Directors' and auditors' fees, taxes, salaries, printing, postage, etc. ....	\$28,897.24
Other Income Charges:	
Interest on bonds.....	\$525,000.00
Interest on dividend certificates.....	37,877.23
Interest on loans .....	19,233.08
Total .....	\$582,110.31
Total .....	611,007.55
Net income for the year.....	\$723,215.08
Profit and Loss Credits:	
Surplus at beginning of year.....	\$433,567.42
Adjustment of book value of Philadelphia Company stock, being the amount of underwriting commission received.....	40,000.00
Total .....	473,567.42
Profit and loss—gross surplus.....	\$1,196,782.50
Profit and Loss Charges:	
Donation to San Francisco relief fund.....	\$50,000.00
Dividends .....	750,000.00
Total .....	800,000.00
Profit and loss—surplus, Dec. 31, 1906.....	\$396,782.50

THE RAILROAD COMMISSIONERS ON THE WOODLAWN  
WRECK

The report of the State Board of Railroad Commissioners of its inquiry into the causes of the wreck of the Brewster express on the Harlem division of the New York Central Railroad, on Feb. 16, was published Tuesday, May 7, and makes ten recommendations for reforms in conditions on the New York Central lines in the "electric zone," which range from better methods of spiking down the rails and the super-elevation of curves to changes in the administrative officers which will place responsibility more directly where it belongs.

The cause of the accident itself the board finds to have been in the weak track, which was reported by the engineer of a train

which went over the Woodlawn curve some hours before the disaster.

"The accident, therefore," says the report, "was the result of a track condition, plus speed, plus again the neglect to locate and remedy conditions that had been reported on the morning of the accident."

Much stress is laid in the findings of the board on the failure of the officials of the road to take proper warning from the report of the engineer who telegraphed his finding of "rough track" at the Woodlawn curve. It blames the superintendent of the Harlem division for not having warned the engineer and motormen of each succeeding train of the reported condition of the track, and expresses the further opinion that no trains should have been allowed to run over that stretch of track even at schedule time until the track supervisor of that division had reported that everything was right.

No evidence was produced, the board thinks, which would justify the laying of the blame for the accident on anything but a defect in the track, "and the board assumes," says the report, "that there is no such evidence in existence, as the company stated at the opening of the inquiry that it would render all the assistance it could through its employees in coming to a conclusion as to the cause of the wreck."

As to the responsibility of those who had charge of the adjustment of conditions to the electrification requirements, the report has no fault to find, except for the failure of the operating officials to run dummy trains for a sufficient period over all parts of the road to determine the actual working conditions of the new equipment.

PLAN FOR REMOVAL OF CHICAGO STEAM RAILROAD  
TERMINALS TO THE OUTSKIRTS OF THE  
BUSINESS DISTRICT

Representatives of the traction companies of Chicago met the railroad terminal committee of the Commercial Club May 1, and reached an agreement to work out a down-town transportation system that will induce the steam railroads to remove their terminal to the outskirts of the business district. The plan under consideration contemplates the establishment of railroad terminals outside of the district bounded by Twelfth Street on the south, Halsted Street on the west, and Chicago Avenue on the north. A double-decked subway system will furnish a means of rapid transportation to and from the railway stations. At the meeting, Bion J. Arnold explained the double-decked subway system he has worked out for the down-town district, and showed how extensions could be made to the system to reach railroad stations north and west of the river. He informed the committee that it was his intention to urge the city and the traction companies to construct immediately the smaller of the subway systems contemplated by the traction ordinances. The railroad men expressed themselves as not believing that this small system would relieve the congestion sufficiently to justify the removal of the terminal. They are, however, satisfied that with a proper subway system it would be more convenient for passengers to reach outlying depots than to reach them under the present conditions.

Harvey B. Fleming, chief engineer of the Chicago City Railway, has been selected by the railway company as its representative on the supervising Board of Engineers, which is to have charge of the reconstruction of the Chicago City Railway under the terms of the traction settlement ordinance. The board will be composed of three members, Bion J. Arnold as chairman, Mr. Fleming and an engineer to represent the city. The city is to appoint its representative within thirty days.

According to President F. H. Rawson, of the Union Trust Company, stock of the underlying companies of the Union Traction Company is being deposited with the trust committee at the rate of 1000 to 3000 shares a day, in response to the call.

A committee composed of Controller Wilson, Corporation Counsel Brundage, Engineer Arnold, Special Counsel Walter Fisher and Chairman Foreman, of the local transportation committee, is working over a system of accounting for the division of the net profits between the city and the traction companies, as provided by the traction ordinances.

At a mass-meeting of traction employees, held April 29, it was voted to demand from the Union Traction and the Consolidated Traction Companies an increase in wages amounting to about 30 per cent and an 8-hour day.

## NEW HAVEN CONSOLIDATED MEETING

A special meeting of the stockholders of the New York, New Haven & Hartford Railroad Company will be held in New Haven May 31, to amend the charter and consider and act upon the proposition to merge the company with the Consolidated Railway Company, a majority of whose stock is owned by the New Haven Company. The following details of the plan are set out, but not officially, from New Haven:

Instead of the stockholders of the New Haven road voting at the special meeting to be held this month on a proposition which would make the Consolidated Railway, composed of the electric lines in this State owned by the New Haven, a part of the corporation, they will take action on a proposal to make the New Haven a part of the Consolidated. The New Haven road, if the stockholders approve, will be operated under the charter of the Consolidated Railway Company, which has a liberal charter and one that would, on the whole, work to the benefit of the New Haven Company.

## PLANS FOR THE TOLEDO, WABASH & ST. LOUIS

Plans announced by President C. D. Whitney, of the Toledo, Wabash & St. Louis Electric Railway Company, indicate that construction work will be begun not later than July 1, and that the first 13 miles will be in operation by the end of the year. The company has most of its franchises between Toledo and Defiance, and now controls the old Maumee power house at Miami, the largest water power house on the Maumee River and of sufficient capacity, it is thought, to furnish power for the section between Toledo and Defiance. The construction work will be pushed along as rapidly as possible, but Defiance will probably not be reached before next spring or summer, if the plans are carried out as now arranged. Mr. Whitney says that the grading will be so light between Toledo and Neopolis that not more than 70,000 sq. yds. of earth will have to be moved. The track will be rock ballasted, control of quarry No. 2 at Waterville having been secured, and will be laid with 70-lb. steel rails. Catenary construction will be used. This will be the first road in Ohio to use this construction to any extent.

## INSPECTION OF CAR EQUIPMENT AND ACCIDENT REPORTS

The Indiana Railroad Commission has notified steam and electric railway companies operating in Indiana that by authority of a recently-enacted law the Commission would soon send out inspectors to examine the car equipment, the track, the rolling stock, etc., and would also furnish the companies with blanks for accident reports. The new law requires said companies to make two reports of every accident to the Commission—one, a preliminary report, is to be made within five days after the accident, giving place and date of the accident, the probable cause, the number of persons killed and injured; a blank for a second report, to be made within twenty days after the accident, is also furnished. This second report is much more complete, and shows whether the accident was due to a collision, derailment or other cause; at or near what station, on what division, the number of train or trains, the names of the engineer, fireman, motorman or motormen and conductors, the exact time of the accident, and an explanation of the cause of the accident. The report must also show the age, residence and occupation of each passenger, employee or other person killed or injured, also the extent of the injury as near as can be ascertained. Lastly, the amount of the property damage is to be enumerated.

## ELECTRIC RAILWAY ENGINEERING AT CORNELL

The seniors in electrical engineering and in mechanical engineering in Sibley College are manifesting great interest in electric railway work. About 110 are taking the general railway lectures, and one-half this number are in the more highly specialized course. The non-resident lecturers this year include C. O. Mailloux, of New York, and W. N. Smith, of Westinghouse, Church, Kerr & Company. Mr. Mailloux's lectures have dealt with velocity-time curves and mechanical integration as applied to their manipulation. The series of six lectures now being delivered by Mr. Smith discuss the construction of the road from the preliminary examination to its completion. They also

include a comparison of steam and electricity in operation.

Such courses as this are given only in the latter half of the senior year. Up to that time the students are occupied with routine studies intended to train them for their practical work. It is felt, however, that in the last term the students should be given a general idea of the manner in which mechanical and electrical principles are applied to various phases of engineering work. Information courses are not considered to be of value, but illustrative material must be given to students at the proper time in order to fix in mind the principles and to produce a feeling of confidence in their applicability to practice.

## B. R. T. EMPLOYEES' BENEFIT ASSOCIATION OPENS RESTAURANT FOR EMPLOYEES

The Brooklyn Rapid Transit Employees' Benefit Association has still further extended its influence over its members by operating a dining room for the men at the East New York quarters of the association. The formal opening took place Friday evening, May 3, when a dinner was given by the trustees of the employees' association. The association has for some time past had the matter of a dining room for the employees under consideration, the success of the arrangements made by the company for supplying the men at Coney Island during the summer season really suggesting a permanent restaurant. The traffic to Coney Island in the summer is extremely heavy, and the company several years ago found that the employees in many cases were compelled to patronize places nearby where the accommodations and food were none too good. Consequently, the company erected at the Culver terminal a restaurant where the employees could at once secure prompt service and wholesome food with a minimum of inconvenience.

The plan of the restaurant as operated at East New York, however, is somewhat different from that followed at Coney Island. At East New York the platform men employed on such lines as Broadway and Fulton Street and the elevated lines, and the shop employees in the elevated and surface car terminal all have access to the dining room. Here between 11 a. m. and 2 p. m. a regular dinner of five courses at 25 cents is available for those who desire it; individual dishes may be bought or a man, if he is in a great hurry, can stand up at a lunch counter, and take a bite just as the majority of business men do at the cafés which recently have become so numerous.

The part of the club house that has been set aside for the restaurant extends along Fulton Street, and was formerly used as a reading room. The reading room itself has been transferred to the gymnasium floor, which is very large and answers very well all requirements as the lighting is very good. In addition to the room thus taken over, an irregular extension has been built to the club house proper on the yard side, which provides five windows besides the two in what formerly was the old reading room. Back of the dining room is the kitchen. As the dining room and kitchen are on the level of the regular club house floor, there is available on the ground floor the rooms under the dining room and the kitchen. The room under the kitchen is used for the ice-box. The room under the dining room is used as a store house.

Besides the regular equipment of chairs and tables for the dining room, affording accommodations at one time for 150 persons, there is a special lunch counter at the yard side of the room such as are generally installed in buffets. This counter is about 22 ft. long, and directly back of it are two large windows. Here sandwiches and other *a la carte* dishes are served. In laying out the kitchen the watchword has been economy of space with the maximum room for convenient working. Entrance from the dining room to the kitchen is by swinging doors, one in and one out. To the right of the entrance is a movable swill table with working space on all sides. Against the right wall are a washing table, rinsing table, drain board, pot washers' sink and shelves. Then there is a sink with space on three sides. This completes the equipment for this side. At the back to the right are four large ranges with a common flue. To the side of them is a window which sheds light on the ranges.

On the yard side is the stairway leading down into the stock room, of which mention has been made before. To the side of the door leading out in the dining room is a large counter for salads, cold meats and pie, with suitable boxes underneath for silver. The table linen and the silver arc marked with the emblem of the association.

## TWIN CITY COMPANY INCREASES WAGES

The Twin City Rapid Transit Company, of Minneapolis, St. Paul and Stillwater, has announced that the wages of all its trainmen will be increased on June 1. This is a voluntary action on the part of the company and, coming as a complete surprise, was received with great satisfaction and pleasure. The following is the new schedule of wages to be effective from and after June 1, 1907: For the first year of service, 21 cents an hour; for the second year of service, 22 cents an hour; for the third year of service, 23 cents an hour; for the fourth and fifth years of service, 24 cents an hour; after five years, 25 cents an hour.

All trainmen appointed during the past year will receive the 22-cent rate during the second six months of the first year of service.

This means that a large percentage of the company's employees will immediately receive the maximum rate of 25 cents per hour, which is 3 cents more than the present scale provides.

It has always been the desire of the company to promote a feeling of friendliness and loyalty on the part of its men. This feeling has developed not only by reason of the sharing of its prosperity with its men, but when sickness, bereavement or other misfortunes have overtaken them the company has always shown a readiness to offer assistance, when such assistance was acceptable and desirable.

## LEGISLATION IN PENNSYLVANIA

Now that the trolley eminent domain bill has been placed upon the Senate calendar practically as it passed the House, the organized electric railway interests of the State feel sure that it will reach the Governor before adjournment on May 16. That the Governor will sign it is not doubted. With the right to condemn land for construction purposes where the consent of 51 per cent of the affected land owners has been obtained, and the right to haul freight, the electric railway interests will have finally come into their own in Pennsylvania.

Representative Simpson's bill, to give electric railway companies unrestricted rights as common carriers under certain conditions, passed finally in the House last week. It provides that when an electric railway company and local authorities unite in petition, the electric railway company may handle heavy freight, such as stone and timber, as well as light freight and express matter, and become a general common carrier.

The bill now in the hands of the Governor prohibiting steam lines from controlling parallel or competing passenger railways, may affect the Pennsylvania Railroad Company's control of the electric line between Altoona and Hollidaysburg, and the Cumberland Valley Railroad Company's control of the large system of the Valley Traction Company, operating between this city and Carlisle, Marysville and New Cumberland, also the Chambersburg & Gettysburg Electric Railway. It is asserted that railroad companies, in view of the prospective grants of eminent domain and freight carrying privileges, were seeking control of other trolley lines, and that soon this means of transportation would be absorbed by the steam roads. The bill was introduced by Representative Hull, of Luzerne, and goes into effect immediately upon its approval by the Governor.

The House has unanimously passed the two remaining Reynolds bills, to enforce sections of Article 17 of the Constitution, and control common carriers by penal legislation. The first forbids the consolidation of competing or parallel transportation lines, whether railroad or canal, and provides a penalty of \$20,000 for the offending corporations. In the second bill uniform rates for freight and passenger service to all patrons getting the same service are directed, the penalties being \$20,000 fine for the corporation and \$1,000, or three years in jail, for employees.

The Beidleman bill, requiring electric railway companies to equip their car platforms with enclosed vestibules, which has passed the House and now goes to the Senate, requires that every trolley car used in the transportation of passengers shall be enclosed between Dec. 1 and April 1. There is a fine of \$10 per day per car for cars operated without being so equipped after December begins, the proceeds of the fines to be applied by the county for improvement of highways.

The Governor has signed the bill requiring steam and street

railways to report on or before Aug. 1, next, and every three years thereafter, to the Secretary of Internal Affairs, the number of miles they operate. The bill fixes a penalty of \$500 for failure to report, or make an incorrect report. It was drafted by Senator Williams, of Tioga County, and is designed to permit the railroads to charge passengers only for the actual number of miles traveled and not for the distance fixed by the roads.

## REPORT OF THE 1906 CONVENTION

The copy of the proceedings of the American Street and Interurban Railway Association, at its Columbus Convention, has been issued by the secretary. It contains 472 pages, with the papers, reports, discussion, attendants, constitution, list of member companies, associate members, etc. Among the reports is that of the committee on municipal ownership, printed elsewhere in this issue, and that on standard rules.

## SALT LAKE STRIKE SETTLED

The strike of the employees of the Utah Light & Railway Company, of Salt Lake City, declared Sunday, April 29, ended Wednesday, May 1, after a conference had been held between the men and General Manager Bancroft. The company positively refused to entertain the demand for recognition of the union, and this was finally waived. A new schedule of wages is announced, however. It is said to provide a rate of 25 cents an hour for first-year men and for 30 cents thereafter. The car house men are given a 10 per cent increase. The agreement is to continue for two years, or until May 1, 1909.

## STRIKE DECLARED IN SAN FRANCISCO

The management of the United Railway of San Francisco is confronted with another strike of its employees. The men insisted on the demands enumerated in the STREET RAILWAY JOURNAL of May 4, and finding they would not be granted went on strike, Sunday, May 5. The platform men this time are reinforced by the stationary firemen, who demand recognition of their union and an increase of wages from \$2.75 to \$3.25 a day. In addition to the strike of the street railway employees the iron workers are out, the large laundries are not in operation and the telephone service is partially suspended.

The STREET RAILWAY JOURNAL has recorded from time to time the progress of events in San Francisco, and in the issue of March 16, 1907, published at great length the findings of the recent arbitration board. It is these findings that President Calhoun, of the company, says must be lived up to. Mr. Mullaly, speaking for Mr. Calhoun, said on Monday:

"No committee representing the local union will be recognized. The company has no quarrel with unionism as a principle, nor is it opposed to organized labor as a body, but it has done with the local car men's union. That union has twice broken faith with this company and has seized many opportunities to annoy and harass the company prior to presenting the unreasonable and impossible demand formulated within two months after the United Railways had granted an increase of 20 per cent in wages."

At 2:30 Tuesday the company made its first attempt to resume operations by sending out seven passenger cars, manned by about forty men. The start was made from the company's car house at Turk and Fillmore Streets, where a crowd of from 3000 to 5000 men and boys had gathered. That led to the serious riot in which four persons were shot. This serious conflict, however, was preceded just before noon by bloodshed, when an attempt was made to run a freight car manned by four inspectors out of the car house. An inspector was severely injured by a flying missile.

On Wednesday cars were run from Oak Street out to Devisadero and along the latter street, but no attempt was made to operate cars in the business section. The police disarmed all men running cars, and this seemed to incite the mobs to violence, for a number of skirmishes are reported in which considerable damage was done to the company's property.

## COURT DECISION IN THE DETROIT CASE

A decision has been handed down by the State Supreme Court of Michigan to the effect that the city of Detroit cannot build street railway tracks to be leased to an operating corporation. For some little time there has been much discussion in Detroit as to the terms for renewing the franchises of the Detroit United Railway for the operation of a number of its lines. As yet the question has not been settled. The City Council in 1905 ordered the Department of Public Works to lay tracks on several streets and appropriated \$10,000 to begin work, presumably for the purpose of securing competition for the Detroit United. A question as to the legality of this action was raised, and an injunction was sought to restrain the city. The decision of the State Supreme Court is the final result of the legal procedure instituted at that time.

## EXTENSIONS IN THE THERMIT COMPANY

Owing to the resignation from the Thermit Company of R. F. Kelker, Jr., whose appointment as engineer of track in Chicago, under the Board of Supervising Engineers, is mentioned elsewhere in this issue, the company announces certain changes in its staff. Mr. Kelker's place will be taken by G. E. Pellissier, who has been traveling throughout the country for the Thermit Company during the past year and a half. Mr. Pellissier was formerly engineer of track and maintenance of way at Holyoke, Mass. The Thermit Company has also secured the services of C. F. Gailor and W. R. Hulbert. For the last two years Mr. Gailor has been chief engineer of the Binghamton Railway Company, of Binghamton, N. Y., and previous to that time was chief engineer of the Rutland Railway, Light & Power Company. He was also connected with the Hudson Valley Railway Company for four years, during which time he acted in nearly all capacities, from rodman to engineer in charge of construction. Mr. Hulbert has been managing editor of "Compressed Air" since May, 1906, and secretary of the Kobbe Company for the past year and a half. He is a graduate of the mechanical engineering course at Columbia University, and is a full member of the American Society of Mechanical Engineers. Before his association with the Kobbe Company he was assistant to the sales manager of the Rand Drill Company. These changes do not affect the position of A. M. Guenther, who for the past year and a half has had charge of the other branches of the thermit work.

## NEW YORK RAPID TRANSIT COMMISSION REPLIES TO THE INTERBOROUGH COMPANY

The Rapid Transit Commission of New York voted unanimously May 2 to send an ultimatum to Theodore P. Shonts, president of the Interborough-Metropolitan Company, to the effect that the board will not allow the Interborough Company to third-track the Second and Third Avenue elevated lines unless the Interborough will agree to build, with its own money, the Lexington Avenue subway north of Forty-Second Street and the Seventh Avenue subway south of Forty-Second Street. This proposition was embodied in a resolution introduced by Vice-President Starin, who presided at the meeting. The resolution provided further that the Interborough Company must agree to give a system of universal transfers between subways, elevated and surface lines in Manhattan and the Bronx.

"I believe that the Interborough Company is under every obligation to construct the subways which were recently advertised, and which it says it will be willing to construct if the terms are made satisfactory," said Mr. Starin. "If, however, this board shall grant to that company these elevated additions, I am very certain it will be very useless for the city to look for any further co-operation on the part of that company in building municipal subways."

The Interborough will not accept the offer. Mr. Shonts says that it is absurd to think that any one is going to put money into subway construction under the conditions proposed and intimated very clearly that the company would stand on the letter that was sent to the board last week when the company failed to bid on new subways. This letter was condensed and published in the *STREET RAILWAY JOURNAL* for May 4.

## OKLAHOMA COMPANY REORGANIZES

The Tecumseh-Norman Traction Company, which was recently chartered, has been reorganized as the Oklahoma Rapid Transit Company, with offices at Oklahoma City. The company will build an electric railway from Oklahoma City to Norman and to Tecumseh. The surveys from Tecumseh to Norman have been made and a line will now be run between Norman and Oklahoma City. The officers are as follows: George Silsby, president; W. E. Powell, vice-president; George Weed, secretary; D. D. Klapp, treasurer. The directors are J. H. Surber, S. B. Mitchell, H. Loop, E. W. Milburn, W. E. Powell, George Weed, M. H. Tennison and D. D. Klapp.

## PUBLIC SERVICE BOND TAXATION HEARING IN BOSTON

Representatives of several Massachusetts street railways appeared at a hearing held on May 6, in Boston, before the legislative committee on traction, to protest against the passage of a bill taxing future issues of bonds by public service corporations. Bentley W. Warren, for the Massachusetts Street Railway Association, emphasized the burden which such a law would throw upon the street railways, and pointed out that many companies would be forced to the wall if the bill was passed. The present system of taxation has been in effect forty years, and since it went into effect practically all the street railways in the State have been built. By paying for part of the cost of street railways in bonds it has been possible to make both ends meet in many cases, where otherwise the roads could not have been built. If in addition to the tax on new bonds the companies are taxed for \$50,000,000 bonds outstanding the street railways would be taxed far in excess of the average tax on all property, which is \$16 per thousand in the State.

President Crapo, of the New Bedford & Onset Street Railway, urged that street railways now contribute to the public treasury more than any other business. The debt of all Massachusetts companies in 1905 was \$71,000,000. They paid on their capital stock a tax of \$1,892,000, but if the bill had been in effect the tax would have increased 60 per cent, although the average dividend was 4.5 per cent.

Attorney Hunt, for the Boston Elevated, stated that his company paid last year in direct taxes more than \$1,000,000, with an additional \$611,849 for the paving of streets outside the rails and the rentals of subways. The total amount paid to Boston Elevated stockholders was less than half this total. Within a short time the outstanding bonds of the company will amount to \$13,300,000, which is the exact amount of the present capital stock of the company, and which last year was taxed \$673,000. If the company should be obliged to double this amount the excess burden could come from no source other than the amount set aside for dividends, and the later would be reduced to about 1 per cent. Judge Hammond, president of the Northampton system, stated that the proposed law would take 2 per cent out of the dividend, and several other street railway men urged that its passage would mean either poorer service or increased fares.

The opinion of those who have followed the course of events is that the measure will not be passed.

## STREET RAILWAY PATENTS

[This department is conducted by Rosenbaum & Stockbridge, patent attorneys, 41 Park Row, New York.]

### UNITED STATES PATENTS ISSUED APRIL 23, 1907

850,951. Rail Tie; H. K. Myers, Swissdale, Pa. App. filed Feb. 13, 1907. A pair of cross-ties connected by a pair of spreader-plates which parallel the rails, the ends of the spreader-plates being disposed upwardly to form supports for the rails.

850,973. Quadruplex Cycle; Stoughton P. Shafer, Kansas City, Mo. App. filed Jan. 12, 1907. Relates to an amusement device.

850,979. Compound Railway Rail; George B. Stephens, Sherman, Tex. App. filed Feb. 12, 1907. The rail is divided into

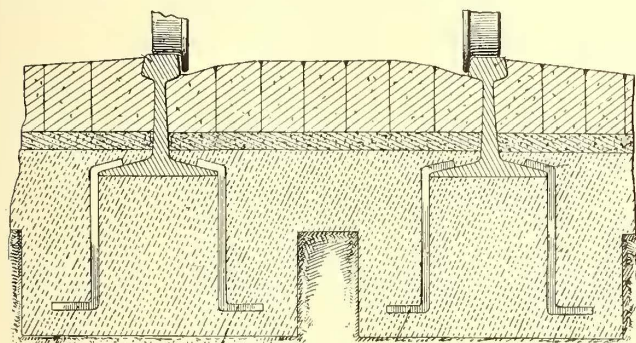
three parts in such manner that the whole tread or either side thereof may be removed and replaced.

850,982. Rail-Joint; Samuel Toman, Dayton, Ohio. App. filed May 10, 1906. The web of the rail and the fish-plates are slotted so as to receive H-shaped bolts, which are turned 90 degs., so that their heads will engage the sides of the slots. The fish-plates, which are wedge shaped laterally, are then driven into position.

851,029. Trolley Retriever; Simeon F. Pierce, St. Paul, Minn. App. filed Oct. 30, 1905. A pneumatic cylinder tensions a spring which normally holds the pole in raised position. A dash pot device causes a valve to relieve the air pressure in case of an abrupt upward movement of the pole.

851,273. Triple Valve; Robert H. Blackall, Edgewood Park, Pa. App. filed June 13, 1903. A quick action triple valve device having a small passage for equalizing the auxiliary reservoir and train pipe pressures, said passage being opened by the movement of the triple valve piston to its normal emergency position.

851,277. Fluid Pressure Brake; Francis L. Clark, Pittsburg, Pa. App. filed July 14, 1904. A primary brake cylinder and piston and a secondary brake cylinder and piston independent of the first brake piston, and a fluid-pressure operated clutch or locking mechanism for one of the brake pistons.



PATENT NO. 851,405

851,316. Automatic Air Signal, Air Brake and Steam Coupling; Herman C. Priebe, Blue Island, Ill. App. filed July 31, 1906. An automatic device for either air brake, air signal or steam couplings between cars.

851,405. Rail Fastening Device; James P. Crerar, Denison, Tex. App. filed Jan. 9, 1907. A street pavement of cement or concrete foundation, having fastening devices for railway rails adapted to be embedded therein, and comprising an end portion adapted to engage the flange of the rail and a body portion extending down into the pavement below the rail to form an anchor.

851,415. Trolley; Charles Y. Haile, Uniontown, Pa. App. filed June 26, 1906. Rods hinged to the harp and spring impelled upward therefrom to guide the wheel on the wire. The rods yield downwardly in passing hangers, etc.

851,442. Rail Fastener; Frank Schlicker, Willock, Pa. App. filed Feb. 18, 1907. A rail chair has lugs engaging the tie and the base of the rail and holes in said base through which spikes are driven to engage the fish-plates.

851,508. Switch Throwing Device; James Fisher, East Liverpool, Ohio. App. filed Sept. 17, 1906. A tappet wheel in the roadbed has radial arms adapted to be engaged by a shoe depending from the car. A rod is pivoted at one end to one of the arms of the tappet wheel, and at the other end has a crank pin connection with a disc connected with the switch point.

851,523. Automatic Block Signal; Newton C. Keeling, Bridgeport, Conn. App. filed Oct. 31, 1906. A single-track block signal system for trolley roads having an overhead trolley. Star shaped devices are mechanically impelled to rotate by the engagement of the trolley wheel in passing, and thus control the signal circuits.

851,590. Rail Splice or Joint; Jacob W. Fennel, Johnstown, N. Y. App. filed Jan. 17, 1907. The adjacent ends of the rails are cut away so as to overlap each other, and one of them is provided with perforations and the other with pins in its overlapping portion, one of which pins is provided with screw threads and nut, and a shoe or plate for the rails, the sides of which overlap the sides of the bottom of the rails.

## PERSONAL MENTION

DR. KARL GOLDSCHMIDT, of the Goldschmidt Thermit Company, is in this country.

MR. JOHN I. PLATT, of Poughkeepsic, N. Y., formerly president of the Poughkeepsic City Railroad, is dead.

MR. FREEMAN C. GERBERICH, of Dauphin, has been appointed by Auditor-General Henry Houck chief of the Bureau of Railways, succeeding Mr. W. W. Morgaridge, of Corry, Pa.

MR. C. K. DEFINBAUGH has resigned as master mechanic of the Cumberland & Westernport Electric Railway Company, and has been succeeded by Mr. D. D. Price, of Frostburg, Md.

MR. E. W. POOLE has recently resigned as assistant treasurer of the Connecticut Railway & Lighting Company, at Bridgeport, and is now associated with the Philadelphia office of the United Gas Improvement Company.

MR. WALTER A. GRAHAM has resigned as claim agent of the local lines of the Consolidated Railway Company, at New Haven, Conn. Mr. Graham, who has been connected with street railway interests about forty years, retires to private life.

MR. J. B. LIVINGSTONE has resigned as auditor of the Oregon Water Power & Railway Company, of Portland, Ore., and Mr. A. L. Flatland has resigned as master mechanic of the company, to become connected with the Jersey Central Traction Company, of Keyport, N. J.

IN THE ARTICLE on the Lima Tramway system published in the May 4 issue, reference should have been made to the fact that the managers of the *Empresas Electricas Asociadas* are Dr. M. I. Prado y Ugarteche and Sr. Emilio S. Godoy. The tramway management is in the hands of Mr. Godoy.

MR. C. H. CLARK, who for four years has been superintendent of maintenance of ways of the Cleveland Electric Railway Company, has resigned, to enter the service of the International Traction Company of Buffalo in a similar capacity. In the local controversy in Cleveland Mr. Clark has had charge of removing tracks.

MR. HECTOR W. MACKAY, division superintendent of the Boston & Worcester Street Railway, has resigned to become superintendent of the Northern division of the New Hampshire Traction Company, with headquarters at Hampton, N. H. Mr. Edwin C. Whitney succeeds Mr. Mackay on the Boston & Worcester. His headquarters are at Marlboro.

MR. BURTON B. PIERCE, who for the past three years has been superintendent and chief engineer of the Mansfield Railway, Light & Power Company, of Mansfield, Ohio, has resigned from that company and accepted the position of chief engineer for the Washington Portland Cement Company, at Concrete, Wash. Mr. Pierce has already entered upon his new duties.

MR. GEORGE BULLOCK, president of the United Gas & Electric Company, of New York, has been elected president of the Lancaster County Railway & Light Company, succeeding Mr. W. W. Griest. Mr. Charles E. Griscom, of Philadelphia, has been elected vice-president, and Mr. M. W. Dodge secretary-treasurer of the company. The control of the company recently passed into new hands.

MR. C. M. CLARK, of Philadelphia, chairman of the executive committee of the Portland Railway, Light & Power Company, of Portland, Ore., has been elected president of the company to succeed the late Mr. Henry Walton Goode. Mr. Clark will maintain his residence at Philadelphia, and the active management of the property will be vested as heretofore in Mr. F. I. Fuller, in direct charge of the railway system, and Mr. F. G. Sykes in charge of the electric lighting and power branches.

MR. A. S. RICHEY has been appointed professor of electric railway engineering at Worcester Polytechnic Institute. Prof. Richey was successively in charge of the mechanical and electrical departments of the Citizens Street Railway Company at Muncie, Ind., and of the Marion City Railway Company, and chief engineer of the Indiana Union Traction Company. He has been assistant professor at Worcester since 1905. Dr. George R. Olshausen, who has been appointed assistant professor, was formerly chief engineer of the Union Depot Railroad Company at St. Louis.

MR. F. T. BUCHANAN, superintendent of the railway and amusement department of the Key West Electric Company, has resigned because of ill health and returned to his home in Woburn, Mass. Mr. Buchanan has been succeeded by Mr.

N. B. Rhoads, formerly of the Savannah Electric Company. Mr. Buchanan, previous to coming to Key West, was general superintendent of the Cape Breton Electric Company, of Sydney, C. B. He was transferred to Key West by Messrs. Stone & Webster, thinking the South would benefit his health.

MR. JOHN G. PHILLIPS, at present purchasing agent and superintendent of rolling stock of the Hudson Valley Railway Company, has been appointed assistant general manager of the company. Mr. F. W. Kinmouth, who has been superintendent, will sever his connection with the company, and Mr. John H. Cain, of Glens Falls, who has been the assistant to Mr. Kinmouth, will become superintendent. Mr. D. E. Van Wirt, chief engineer of the company, will hereafter have entire charge of the track and its maintenance, a task which has heretofore been supervised by the superintendents.

MR. R. F. KELKER, JR., who has been associated with the Goldschmidt Thermit Company, of New York, for the last three years as its principal outside engineer, has resigned from that company to take up engineering work in connection with the reconstruction of the tracks in Chicago, under the Board of Supervising Engineers. Mr. Kelker's experience in the track departments of the Brooklyn Rapid Transit, International Railway Company, of Buffalo, and the Baltimore & Ohio Railroad Company eminently fits him for the rehabilitation in Chicago, which will come under his charge. He took up his new duties May 6.

MR. BARRO HARSON, of Toledo, Ohio, has been appointed general superintendent of the Mexico Electric Tramways, Ltd., by Mr. R. C. Brown, managing director of the company, who has been in charge of the property since the resignation of Vice-President and General Manager W. W. Wheatly some time ago. Mr. Harson has long been engaged in street railway work and at one time was connected with the Mexico City Tramways. This was about ten years ago, when the property was managed by Mr. Thomas McLean. In 1897, Mr. Harson resigned from the Mexico Company to enter the employ of the Toledo Railways & Light Company, with which he was connected until about a year ago, when he entered the employ of the International Company, which is engaged in the production of sugar in the State of Vera Cruz.

MR. HARVEY B. FLEMING, chief engineer of the Chicago City Railway Company, has been appointed a member of the new supervising board of traction engineers of Chicago, to represent the Chicago City Railway Company on the board provided for by the new traction ordinances. Mr. Fleming has been for seven years employed by the Chicago City Railway Company. He was educated at Washington University, St. Louis, where he did post graduate work after obtaining his degree as bachelor of science and the degree of master of engineering. For three years Mr. Fleming was an assistant engineer in the water department of St. Louis; then he entered street railway work and was for two years in the employ of the St. Louis Transit Company and the National Railway Company. Mr. Bion J. Arnold is the president of the board, under the provision of the ordinances.

MR. F. W. JOHNSON, who for the past five years has been claim agent of the Connecticut Railway & Lighting Company, with general headquarters at Bridgeport, resigned from that company March 1, to accept the position of assistant general claim agent of the Philadelphia Rapid Transit Company. Mr. Johnson commenced his street railway experience in the claim department of the former Lynn & Boston Street Railway Company, under Mr. E. O'Callaghan, claim agent. He remained with this company until after its merger into the Boston & Northern Railroad, and afterwards accepted the position with the Connecticut Railway & Lighting Company, which he has recently resigned. Mr. Johnson is a member of the executive committee of the American Street and Interurban Railway Claim Agents' Association. While in Bridgeport he compiled a series of instructions to motormen and conductors on the prevention of accidents, which has been republished in pamphlet form.

MR. BION J. ARNOLD, according to a newspaper dispatch received as the STREET RAILWAY JOURNAL goes to press, has met with a distressing accident. The report states that while Mr. Arnold was making some adjustment of the machinery of the automobile of his brother the engine "kicked back," striking his chin, which brought his teeth together and the end of his tongue was entirely severed. The account continues, "Mr. Arnold closed his mouth firmly, though the blood from the severed tongue drenched his clothes, sprang into the machine and drove rapidly and accurately to the Mercy Hospital, where he ar-

rived 20 minutes after the accident happened. The surgeons stitched the tongue together and assured Mr. Arnold that it would knit and that he would in time be able to speak again." Another account states that in the hospital Mr. Arnold with pencil and scratch pad gave this explanation of how the accident happened: "Was with my brother in his new auto. He killed the engine; I got out to crank it. Spark lever was too far advanced. Engine kicked back and pulled my chin down on radiator. It cut my tongue clean off. I drove machine to Mercy Hospital, where Dr. J. M. Lilly sewed it on. I am doing no talking for several days."

MR. CHARLES V. WESTON has been selected by Mayor Busse, of Chicago, as the city's representative on the Board of Supervising Engineers, that will have charge of reconstructing the street railway systems of the city. Mr. Weston is 50 years old and has been a civil engineer all his life. In the early eighties he was chief engineer for various Kansas and Texas railroads, coming later to Chicago as engineer for the Northwestern Railway. Soon after locating in Chicago, in 1888, he built the Lake View in-take crib and water tunnel. In 1894 he completed the Van Buren Street tunnel for the West Chicago Street Railway, after which he became in turn chief engineer for the Northwestern and Lake Street Elevated Railways and the Union Loop. Since 1903 he has been chief engineer of the South Side Elevated Railway. The body now consists of Mr. Bion J. Arnold, named in the ordinances as chief engineer and chairman of the board; H. B. Fleming, named by the Chicago City Railway as its representative, the appointment of whom is noted elsewhere in this issue, and Mr. Weston.

MR. IRA A. McCORMACK, heretofore manager of the Grand Central Station and general superintendent of the electric division of the New York Central & Hudson River, has been appointed assistant to the general manager of that road, having charge of matters pertaining to electric operation and performing such duties as may be assigned. Mr. McCormack was born at Pittsburg, Pa., in 1858, and was for twenty years identified with steam railroad work. In 1895 he was appointed general superintendent of the Brooklyn Rapid Transit Company, and after three years of service resigned to become vice-president and managing director of the Syracuse Rapid Transit Company. After serving in this capacity for seven months under the administration of the Everett-Moore syndicate, he was appointed general manager of the Cleveland Electric Railway. On May 11, 1902, he resigned to become assistant manager of the Grand Central Station at New York, and on Nov. 1, 1903, was made manager. On Dec. 1, 1905, he was given the additional title of general superintendent of the electric division of the New York Central. It is expected that Mr. McCormack will spend several months abroad studying foreign electric practice for the purpose of assisting to bring the electric operation of the New York Central up to the most desirable standard. As stated in the STREET RAILWAY JOURNAL of April 27, Mr. McCormack is succeeded as general manager of the Grand Central Station and general superintendent of the electric division of the company, by Mr. A. R. Whaley.

MR. CHARLES M. CRAWFORD, of Hartford, Conn., has been appointed chief engineer of the Cincinnati Northern Traction Company, of Hamilton, Ohio, to succeed Mr. C. A. Alderman, resigned, who, as noted in the STREET RAILWAY JOURNAL of April 6, has become connected with J. G. White & Company. In 1873, when a very young man, Mr. Crawford went to Southern California as one of the corps on the survey made through the Colorado Desert and the Bad Lands of Arizona, serving in that capacity for about four years. Returning to the East in 1879 he entered the employ of the Pennsylvania Railroad and assisted in laying out, under Chief Engineer Brown of the company, the present site of the Broad Street Station in Philadelphia. Afterwards he became assistant engineer for the Pennsylvania Railroad. Mr. Crawford severed his connection with the Pennsylvania Railroad in 1883, and accepted the position of superintendent of the Danbury & Norwalk Railroad, which was rehabilitated under his supervision. In 1886 this road was sold to the Housatonic Railroad. Mr. Crawford's next work was with the Meriden & Waterbury Railroad, which he built for Mr. Horace C. Wilcox and his associates, and managed until it too was sold to the New York, New Haven & Hartford Railroad. About 1894, Mr. Crawford became connected with the Hartford Paving & Construction Company, of Hartford, as secretary and treasurer, and it is this position that he has just relinquished to become connected with the Cincinnati Company. Mr. Crawford has already entered upon his new duties.