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EDITORIAL NOTICE

Street railway news, and all information regarding changes of officers, new equipments, extensions, financial changes and new enterprises will be greatly appreciated for use in these columns.

All matter intended for publication must be received at our office not later than Wednesday morning of each week, in order to secure insertion in the current issue.

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Embarrassing Frankness

There are hundreds of civic officials all over the country who consider themselves entitled to free street car rides, but it is doubtful whether they are all sufficiently hardened to be willing to agree to the conditions which exist in a certain Western city, and which appear to have attracted a little attention. In issuing annual passes to the Aldermen one of the street railway companies in the city in question has stamped them "Pass Alderman Blank, Employee." Possibly objection might be taken to such phraseology by some of those who use the passes, but it is evident that the company has no scruples on the subject. If an Alderman is not an employee, there is no reason under the sun why he should get free fares; and if he is entitled to be a "deadhead," then the word "employee" fits the case about as well as any other. A time will come when City Councils will be compelled by enlightened public opinion to deal with public service corporations on a strict business basis, a consummation devoutly wished by those who have to operate such systems.

Self-Denial

Note is made by the Chicago newspapers of the death of an old resident who during the forty-six years he lived in the city patronized the street cars only half a dozen times, and then for the purpose of visiting the World's Fair. The curious fact about this abstention is that the man was a wheelwright. One would think that his trade would induce him to patronize cheap vehicles running on wheels, but even now there are probably some people who glory in the idea that they have never ridden on the steam cars. Where the glory or the virtue of it comes in is not exactly clear, but it is plain that such folk hold their time cheap. It would not be an unfair inference that they hold their health cheap also, for this trolley abstainer contracted pneumonia because he would rather walk than ride, and so he was gathered to his fathers at the age of eighty-one. Had he availed himself of the cars, he might have attained a century. Mr. Oscar T. Crosby once figured out in these pages the amount and value of time saved by the trolley for "working" members of the community, but no one yet was able to estimate fully the saving to the public in comfort, convenience and all that adds charm to life.

Transfer Abuses

The aim of a great many of the American street railway companies has been to develop and perfect a liberal system of transfers, and the extent to which this has been done is neither known nor appreciated by the public. There is nothing like it in Europe, where the sectional fare system prevails, and where in consequence the total cost of a ride is very often far in excess of the 5 cents that here carries a passenger at least a score of miles if he so elect. In fact, the transfer provision is generally so liberal it is subject to abuse, and evils are liable to develop, some of which are obvious and familiar, others of which only become visible after study and observation. Mr. E. K. Stewart, the vice-president and general manager of the Columbus (Ohio) Railway Company, has referred recently to this question in some public utterances, which are quite significant. He says, for example:

It will interest the public, perhaps, to know that from May 1 to Dec. 1, 1901, over 1,121,000 transfers were issued which were not used at all. We can only estimate from this how large a number were issued and used by some second party. The large number of transfers issued which were never used, averaging, as it did, for the eight months 4362 daily, is a serious tax on the company. The actual cost of these transfers to the company is about \$180 per day.

Now it is evident also that in addition to the other questions that may be involved, the tax put upon the conductor's time by this unnecessary work is quite serious and must militate gravely against the efficient discharge of his other duties. Moreover, there is a duty laid upon the passenger as well as upon the company, and Mr. Stewart remarks:

These transfers are given to patrons to enable them to reach their destination over connecting lines of the system when they cannot do so by one direct line. I regret to say that this condition, which is as valid a part of the contract as the transfer itself, is not observed by the public as it should be. It

is surprising to know how lightly many people hold such an obligation, which is as binding as any, both legally and morally.

This is pithy and well put, and its implication might give food for thought to some excellent folk who believe they are living by the Golden Rule.

It is a curious fact in human nature, and one well worthy the study of psychologists and metaphysicians, that to many persons the moral law is applied differently, depending upon whether the object is an individual or a corporation. The greatest sufferers probably from this idiosyncrasy are railroad companies, and the transfer evil is a case to the point.

Municipal Ownership in the Far West

How is it that the advocates of municipal ownership of street railways have overlooked the one real interesting specimen of a city-owned street railway to be found in the United States? One would expect that such a shining example of street railway operation as that which we are told about by a friend in the legal profession, who returned recently from a Western trip, would have been sought out and held up to the world long ago. It seems that several years ago, during a real estate boom, this town decided it would be beneficial to have a street car line to serve its 3500 people scattered up and down a mountain valley a distance of 1½ miles. The road was built by the city. As to its early history we are not informed, but a description of the present operation of the road will afford a few moments' pleasant recreation from the discussion of 30-ton interurban cars and the demands of metropolitan rapid transit service.

The mile and a half of track built by the city is leased to the street car driver for \$15 per month. There are no troubles from strikes, lockouts, rate of wages or hours of work, for the driver is the whole thing—if we except the horse, which animal, by the way, has learned his routine of duties perfectly. If upon arriving at the railroad depot to meet a train it is found that the train is late Sir Horse makes good use of the time by lying down in the street and taking a nap. This is probably the most accommodating street railway in the United States. We throw this out as a pointer to advocates of municipal ownership, although realizing that the argument may at some time be used against corporate ownership to the great detriment of some of our good friends in the street railway business. We say it is the most accommodating street railway because it has most unusual provisions for taking passengers exactly where they want to go. There is one main magnificent trunk line track, and this is provided with turntables at all the principal streets, where there are "crosstown" lines. The route of the car is dependent on the destination of the passengers or passenger on board the car. Whenever a person wants to go down one of the side streets upon which there are tracks he is accommodated. The car is switched on to the crosstown line by means of the turntable and the passenger is delivered with care wherever he wants to go. To be sure this interferes with the plans of those passengers who live further out, but that is one of the penalties of living at a distance. In other words, it is street railway service to order, and presumably as much superior to the ready-made kind we get in larger cities under private ownership as the coats our mothers used to make were superior to the ready-made store article.

But this is not all in the way of accommodating service. Not only are passengers carried, but trunks are delivered to the various hotels, and thereby hangs a tale. A large part of the patronage secured by the operator of the road is from traveling men between the depot and hotels. Recently a new hotel went up a block from the line. An extension was necessary in order to hold the business. The extension was built by the driver, the city furnishing the material. Incidentally it might be remarked that some of the more esthetic citizens object to the street railway system and the way it is operated, on the ground that it is an eyesore, but surely it would be too bad to deprive the community of such a flexible service or to deprive the United States of such a notable example of a municipally owned street railway.

Pensions for Employees

The plan of pensioning superannuated and disabled employees of the Metropolitan Street Railway Company, the adoption of which was formally announced by President Vreeland last week, has attracted wide attention not only in New York City but throughout the country as a most important event. Civil service pensions, although common abroad, are not paid by the United States Government, and only three steam railroad companies, so far as we know—the Pennsylvania, the Illinois Central, and the Delaware, Lackawanna & Western—have established pension funds for those of their employees who have outlived their usefulness. The Union Railroad Company of Providence, alone among street railway companies, with the exception of the New York example, has a regular system of old age pensions. This system was described in a recent issue of the *STREET RAILWAY JOURNAL*, and, as will be remembered, part of the fund from which the pensions are paid is contributed by the regular employees of the company. In the case of the Metropolitan Street Railway Company, however, all of the money so expended comes from the treasury of the company, and for it the company receives no direct return, except the satisfaction of recompensing those employees who have given it long and faithful service. The institution of the system, we understand, was not the result of any petition or suggestion on the part of the employees themselves, but originated entirely with the management of the company, who had had the plan in consideration for four or five years, and had been devising the best way of carrying out the project.

The announcement of the company's purpose is naturally eliciting from the public and daily press many favorable comments on the generosity of the company. This feeling, however, will be coupled in the mind of the average business man with the sentiment: "It is magnificent but it is not business. There is no moral obligation between a buyer and seller for the former to support the latter for the rest of his life. To many corporations it would mean ruin."

The step is such an important one, whether it is followed by other large employers of labor or not, that its possible and probable results certainly demand careful consideration. It is true that from the standpoint of both business ethics and law the employer completes his part of the contract and discharges all legal obligation to the employee when he pays him his weekly or monthly wage, and any remuneration beyond this, which is not earned by service rendered, is a gratuity. It is also true that any plan of this kind, especially on a large railroad system like that of the Metropolitan Street Railway Company, where long terms of service are the rule and not the exception, will run into considerable money. The experience required of a man in the operating force of a modern electric and steam railroad is so great that his efficiency improves with the length of his service, and such men do not change from one company to another or from one kind of work to another, as in many other lines of industry. As a result, most large railroad companies, like the Metropolitan Company, have in their employ a large number of men who have been in the service the greater part of their life. On the Metropolitan lines, for example, there are to-day quite a considerable number of men who have had 50 years of service. Moreover, the permanency of service on the company's lines has increased greatly during the past decade, as shown by a statement made by Mr. Vreeland in our issue for Oct. 5, that while in 1893, with a force of 4000 men, the average discharges were 300 per month, now, with over 200 per cent more men in employment, the monthly discharges are not within 30 per cent as great as eight years ago.

In the carrying out of its proposed pension plan the Metropolitan Street Railway Company makes only one stipulation, viz., that the beneficiary shall also be a member of the Metropolitan Street Railway Association. This is a mutual benefit organization, comprising a very large majority of the employees of the company, and is run directly by them. Its purposes are those of paying death benefits, maintaining a physician for the benefit of the

members and their families, encouraging educational improvement, social intercourse, etc. It is a body which has done an enormous amount of good during the last eight or nine years, or since its establishment, and for this reason has been encouraged and to a certain extent assisted financially by the company. The reasons for making this a stipulation, which is only a small matter, as nearly all of the employees belong to the association already, and everyone has the privilege of becoming a member, were twofold. The principal reason was that as the system of pensions carries with it a pension for total disability the company desires and has the right to know that a man's physical condition is under competent medical supervision. This is assured to members of the association through its regular physician. A second and minor reason was that the association has accomplished a magnificent work in creating a high *esprit de corps* among the employees, and thus increasing the efficiency of the service. This has been so pronounced that while a man's standing in the company is not dependent upon whether he is a member of the association but on his own efforts, it has been found as a matter of fact the members of the association are more efficient than the average employee outside of the association. It was in consequence, partly in consideration of this fact, as well as in acknowledgment of the efficient work of the association, that the company made the restriction mentioned.

The plan as announced may be considered by some as quixotic philanthropy at the expense of the stockholders, while by certain railway companies it may be looked upon as a dangerous precedent which they themselves may not be willing to adopt, but which will be quoted against them as an example of what is being done for the benefit of the employees elsewhere. As regards the latter charge, we can only say that from our knowledge of the purposes of the officers of the Metropolitan Street Railway Company we do not believe that they would recommend the adoption of the system by all other companies. The situation considered by them was their own entirely, and their reasons for instituting it depended upon conditions on their own line which might not, and probably would not, be fulfilled in many other or perhaps any other system. So far as the former charge is concerned, the plan should not be looked upon as one of charity but one of philanthropy in its broadest and truest sense, or that form which confers good on the giver as well as on the receiver. Any other kind of philanthropy would not only be humiliating for the employee to accept, but would be a breach of faith between the officers of the company and its stockholders. Let us then consider the reasons which have induced the hard-headed business men who are in control of the company to decide to pay out indefinitely a large and growing sum of money from the treasury of the company in consideration of no, or apparently no, return.

The Reasons for a Pension System

The first reason for the adoption of the plan was undoubtedly the one that it settles immediately the question of how to dispose of the cases of employees who have outlived their usefulness. Nearly every company has a large number of men who have been with it for a long time, and have served faithfully in the less remunerative ranks of the service. This has been particularly true with the Metropolitan Company owing to its size and the early date of the establishment of many of its lines. In the past, employees of this company, as they grew infirm and unable to carry on their regular duties, were gradually relieved from the more arduous work and were assigned easier tasks, such as giving out transfers and tending switches, or were given other less laborious positions. The time always comes, however, when some men cannot even perform these duties, and this condition has tended to grow more general with the employment of electricity as a motive power, because about the horse car stable

there was always considerable work of a comparatively easy character to be done, whereas with a modern electric system, on the road, in the repair shops and at the switches, the duties are most exacting, and require both activity of mind and physical strength. The practice heretofore has been, on the retirement of such men, for some fellow worker or friend, or perhaps the man himself, to solicit subscriptions from his late companions to maintain him during the rest of his life, or in some instances to make similar requests from the company itself. The disposition of the serious question of what to do with this class of employees is settled by the adoption of a pension system.

A second consideration was the undoubted incentive given to the men on the road by an assurance for their old age. Many men in the position of motorman or conductor are not able or are not sure that they will be able to lay aside enough of their wages during the period of their active work to support themselves and those dependent upon them when they are no longer able to work. With a system of this kind ahead of a man, however, he feels that every day's work done is just so much capital laid up by him for the future, and in a form from which he can derive the benefit from it when he requires it most. A concrete example will show that the pension thus paid is considerable. For illustration, suppose that a man earning \$800 a year was able to save 25 per cent of this sum, or \$200, which would be a large amount, and better than most could probably do. This would amount in thirty-five years to \$7,000, the annual interest on which at 4 per cent would be \$280 per year. The amount received from the company as a pension for thirty-five years' service by a man earning \$800 a year would be \$320 a year. In other words, the company more than doubles, so far as the man himself is concerned, the income which he would receive from probably the greatest saving he could make. With a thirty-year service and the same wages the pension would be \$240 per year, equal to the income at 4 per cent on \$6,000. With twenty-five years service the pension would be \$200 per year. It will thus be seen that the relief afforded is not merely nominal, but represents as much income usually as a man could acquire by the most careful economy of a lifetime.

The plan as outlined in detail above certainly offers a great inducement not only for conscientious, but also for continuous, work, because if a man throws up his position at the end of a period of five, or ten, or fifteen years, or whatever the time may be, he deliberately destroys his share in the old age insurance which has been created for him. The true economy of the company in establishing a fund of this kind, then, lies in the fact that it makes the interests of the company and the employee identical. In other words, it will be money saved the company if by giving premiums for long and continued service of this kind, available to anyone connected with the system whose wages are below \$1,200 per year, it can be assured of continued harmonious relations with its employees, and that better service which comes only when the employees are imbued with the most cordial sentiments toward the management.

One other point only remains to be considered. The system differs from most other systems of this kind which have been established in this country and abroad in that the company itself defrays the entire expense of the pension fund. The general practice is that the employee himself should bear part of this expense, and this is the practice followed in the police pension fund in New York City and in similar funds abroad. It was not adopted on the Metropolitan Street Railway, however, because the company wished to have entire control of the expenditure under the rules which it had laid down. A man who had contributed to a fund of this kind for a number of years, and was then discharged, might have, or might consider that he had, an equity in the amount which he had contributed, but where the entire expense is borne by the grantee no such question as this can arise,

The Grand Rapids, Holland & Lake Michigan Rapid Railway *

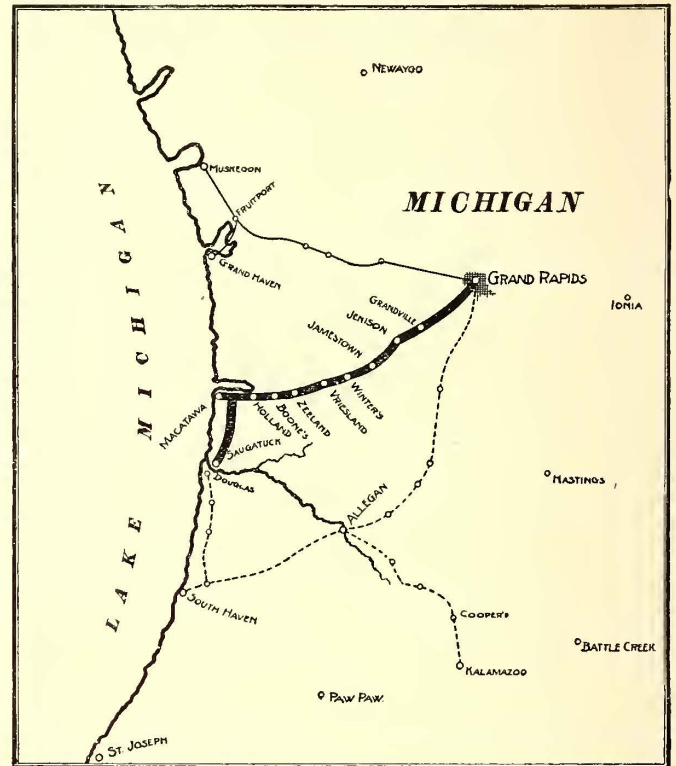
Grand Rapids, Mich., the second city of the State, has long been known as the furniture city. Including suburbs it has a population of nearly 100,000, the growth during the past ten years being 45 per cent. Besides furniture manufacturing it has other industries of importance. The Grand Rapids, Holland & Lake Michigan Rapid Railway was the first interurban to be admitted to Grand Rapids. From there, which is the eastern terminus, the road passes through nine villages and a good farming country, peopled by industrious Dutch and Germans, and given over to the cultivation of fruit.



HIGH AND LOW-TENSION LINE CONSTRUCTION

The general character of the country is rolling. Steam railroad crossings at grade were prohibited, and bridges and subways were consequently built. Grade crossings were permitted over switch tracks, spurs and sidings, when protected with derailing devices inserted in the interurban tracks. The private right of way is 4 rods wide and fenced in. It is protected by cattle guards and danger boards at all highway crossings. One unexpected difficulty was a sink hole 700 ft. long, which was finally bridged by piling driven end on end, a very expensive construction.

It is exceptional to find double tracks provided for in the original construction plans of an interurban. In this case such provision was wise forethought rather than compulsory afterthought. The company's single track steam railroad competitor, the Pere Marquette, parallels the double-track interurban from Grand Rapids to Holland. While trains of the former road are waiting for a passing train the cars of the interurban go whizzing



MAP OF THE GRAND RAPIDS, HOLLAND & LAKE MICHIGAN RAPID RAILWAY

The population served by this road is shown by the following table:

Grand Rapids.....	90,000
South Grand Rapids.....	500
Grandville	1,200
Jenison	200
Jamestown	150
Vreesland	200
Zeeland	2,000
Holland	10,000
Saugatuck	800
Douglas (opposite Saugatuck).....	700

Total population of villages.....	15,750
Township outside of villages, 3 miles on each side of line, and all tributary to line, estimated from reported population of entire townships.....	15,000

Total estimated winter population outside of Grand Rapids.....	30,750
Summer population three to four months (from outside of this district) at Macatawa Park and Ottawa Beach	3,000
Ditto at Saugatuck and Douglas.....	1,000

Additional summer population.....	4,000
Total outside of Grand Rapids.....	34,750

* Abstract of a paper read before the Chicago Electrical Association March 7, 1902, by Geo. A. Damon, managing engineer Arnold Electric Power Station Company, and William D. Ray, consulting electrical and mechanical engineer, Detroit, Mich.

by, giving an uninterrupted service by virtue of the double-track feature.

TRACK CONSTRUCTION

The track is standard gage, with 67-lb. and 70-lb. rails, ballasted with gravel and drained where necessary with 12-in. to 36-in. tiling. The sharpest curve is 6 degs., and the maximum grade 3 per cent, except at the subways in Holland, which is 5.56 per cent. These two subways under three railroads are of steel and concrete.

Two types of bonds are used, a web bond on new rail and a foot bond on relaying rail where angle bars did not permit the usual web bond. These bonds were No. 0000, 6 ins. long, crimped to 5 ins. between centers, furnished by J. M. Atkinson & Co. The drilling of rails for receiving bonds was done by a special machine, which consists of a gasoline engine, tank and batteries, transmission and speed-regulating devices, mounted on a special car equipped with drill stocks. This outfit paid for itself many times over in the saving effected. The engine gave but little trouble and the outfit worked otherwise satisfactorily, requiring only one mechanic for both engine and drills. A combination drill was used, which not only drilled the foot of the rail but also counter-sunk the hole. A screw compressor, operated by two men, was used in compressing bonds. The rail circuit was cross-connected every twelfth pole by a No. 0 tinned copper wire, and connected with a good ground; all switches and frogs were well bonded and cross-connected. Where the tracks crossed a creek the rail circuit was grounded by sinking a metal plate into the flowing water below.

Loops are placed at all terminals and Y's are installed at the two car houses and at Zeeland sub-station. All switches are protected with indicating switch stands and signal lamps at night.

Substantial depots for the small villages and shelters at high-

way crossings have been placed where warranted, and are greatly appreciated by the patrons.

The sub-station buildings at Zeeland and Macatawa are combined with a waiting room and freight office. The attendant for the electrical machinery looks after the selling of tickets, handling of freight, etc. The sub-stations are of white brick and stone construction, with high elevation.

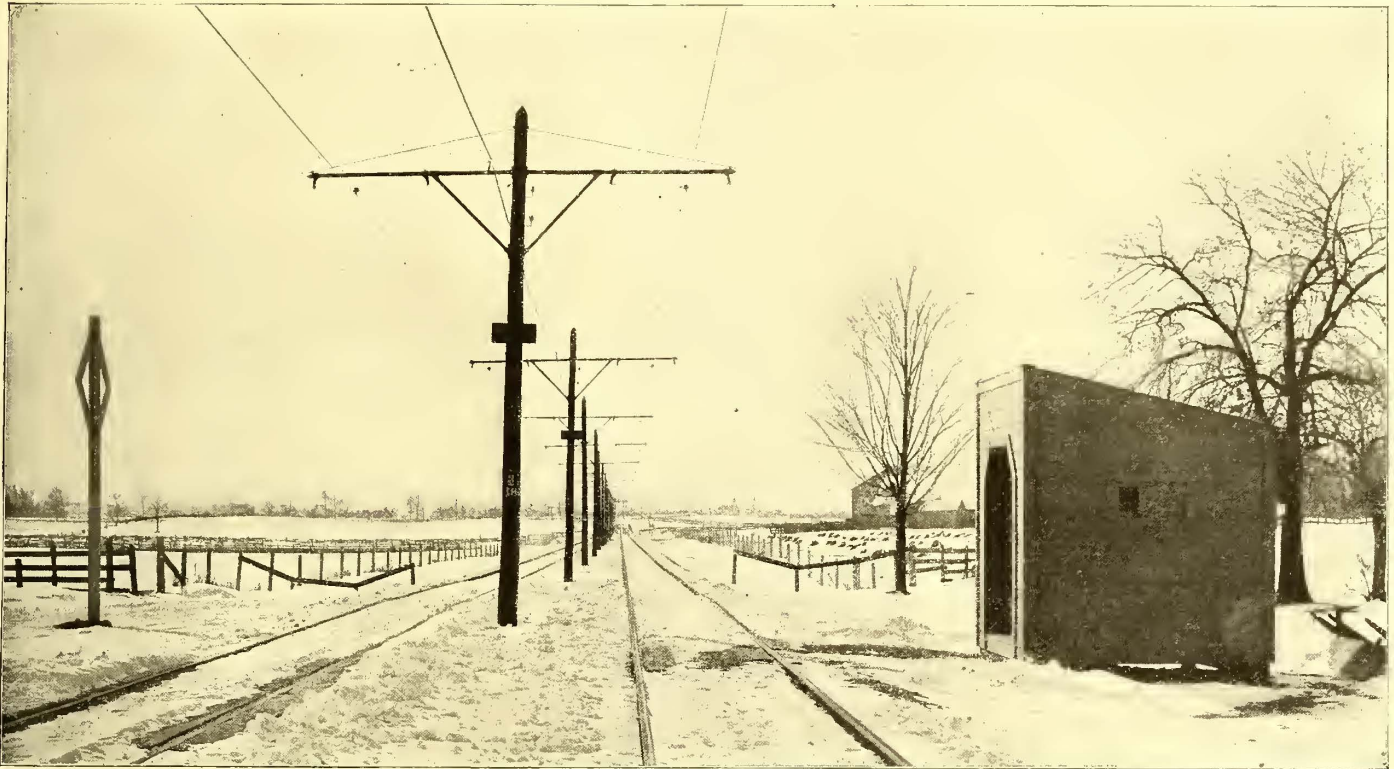
POWER PLANT CONSTRUCTION

In the power plant building itself, and, in fact, in the general design and selection of the entire equipment, an effort has been made to follow the best engineering practice and yet accomplish the result at minimum cost. The plant as completed, therefore, is thought to be a good example of a station thoroughly in keeping with the commercial character of the enterprise which it

as well as all other stairways about the plant, are made of iron with diamond tops and convenient railings.

The building is divided into bents with trusses spaced on 18-ft. centers. At each division point a pilaster 3 ft. wide, extending 2 ft. into the engine room, is carried 23 ft. above the floor to support the beams for the crane runway. The distance between these rails is 45 ft., and the lifting capacity of the crane is 15 tons. This crane has been a great convenience in the erection of the engine room equipment. The crane is operated by pendant chains, the transverse motion being secured by means of a chain hanging directly in front of the gallery, which extends the entire length of the plant. There are two hoisting speeds, a slow speed for heavy loads and a fast speed for overhauling the empty hook and for light loads, and each speed has a separate chain.

The plant is built up of a series of units. The two boilers, of



WAITING STATION AT A COUNTRY CROSSROAD

serves. There is in the plant no waste space, but at the same time crowding has been avoided. There is nothing about the equipment which may be termed a "frill," and yet everything which would pay an interest on the investment, either by reason of more convenient operation or of fuel economy, has been included in the plans. It will be interesting, therefore, to examine the plant with a view to learning the various considerations which entered into the selection and arrangement of its equipment.

The general arrangement is shown in section. The plant at present contains but two generating units. To furnish power for the operation of the road up to its full capacity with frequent and heavily loaded cars will eventually require double the present equipment, so that the necessity of providing for extension, which is so often lost sight of in designing power stations, became in this case one of the first considerations. The engine and boiler rooms, were, therefore, arranged in parallel, and a temporary bulkhead takes the place of one of the end walls, so that the present plant may be considered as just one-half of a completed station.

The engine room is 32 ft. high from floor line to the lower chord of the roof truss. It is 47 ft. wide inside, and at present 72 ft. long. The engine room has a basement 12 ft. high for the accommodation of the condensers and much of the steam piping. This basement is 4 ft. below the boiler room level. The boiler room is 54 ft. wide, 28 ft. high and the same length as the engine room. There are four openings in the fire wall which divides the two rooms, two for doors between the engine and boiler room and two to provide access to the condenser basement from the boiler room floor. These openings are closed by means of metal-covered sliding doors. The condensers can be reached from the engine room floor directly by means of a stairway landing midway between the steam connections to the two condensers. These stairs,

capacity equal to the demands of one engine, are of about the same width as one engine and its contiguous generator. The condenser outfit fits in nicely between the engines and boilers, while the switchboard and high-tension apparatus is located on the floor and gallery on that side of the engine room from which the distribution and transmission wires can conveniently leave the building. The plant can therefore be extended on these same lines.

CAR-HANDLING APPARATUS

The fuel is slack coal, which is received from cars delivered upon a trestle alongside of the boiler room by the railroad company, so that the first movement of the coal is secured by gravity. The next operation is to transfer it from the coal pockets to the boiler furnaces. The plant was not large enough to justify an investment in an elaborate system of coal and ash handling apparatus and storage bins, and yet the fact that the station was to operate nearly twenty hours each day for every day in the year made it desirable to adopt some method of doing away with hand firing. The coal-handling device indicated on the cross section of the power house was selected as combining the advantage of small first investment with the ability to reduce the coal-handling cost. This apparatus has not yet been installed, but the fact that at present the coal and ashes are each handled at least twice only emphasizes the importance of an investment in this part of the plant.

The apparatus shown consists of a traveling bin on a track parallel to the boiler room wall. At frequent intervals along this wall cast-iron pockets with sliding gates are placed ready to deliver the coal from the bunkers directly into the bottom of an elevator leg, the bucket system of which is operated by an electric motor, allowing the bin to be filled from any point of the coal storage. The coal hopper can be moved along by this same

motor until it is brought directly before the furnace to be supplied with coal, which is delivered through an extended spout by gravity. The hopper of each furnace holds a supply sufficient for an hour's run, so that the operation of the boiler room becomes a "one man" job, and it would be hard to reduce the labor item below this point.

STOKERS

From the furnace hopper the coal drops on to a Green chain-grate, made by the Green Engineering Company, of Chicago. The links forming the grate can be inspected as the grate makes



TYPICAL PASSENGER AND FREIGHT DEPOT

each cycle, and each link is removable in case repairs are necessary. Each boiler is fitted with a grate having an area of 53 sq. ft., which is at the ratio of 5 boiler horse-power per square foot of grate area, and as the boilers are rated at 10 sq. ft. of heating surface per horse-power, the ratio of grate surface to boiler heating surface is 1 to 50. The grates are guaranteed to handle successfully from 30 lbs. to 50 lbs. of coal per square foot per hour. The regulating devices include an adjustable gate to fix the thickness of the fuel upon the furnace, a speed-adjusting mechanism to determine the rate of the grate movement, and a system of dampers, both to vary the amount of air through the grate itself and to shut off the upflow of air back of the grate in front of the bridge wall. The ashes are delivered by the moving grate to a pit beneath the boilers, which in this case is designed to hold the amount produced by a day's run at full load, and it is therefore necessary to take out the ashes only once in twenty-four hours.

BOILERS AND DRAFT

The boilers are the Cahall sectional water-tube type, four in number, each with 2650 sq. ft. of heating surface. These boilers and furnaces are guaranteed to transform at least 70 per cent of the heat units of the fuel into energy in the form of dry steam at 150-lb. gage pressure, and under full load conditions will probably do even better.

The fact remains, however, that 20 per cent of the heat energy originally contained in the fuel escapes from the smoke connection at the rear of the boilers. The plant is planned to eventually intercept much of this latent heat energy and transform it back into the boiler system by means of an economizer, and this desirable adjunct will probably be installed at the time the station is completed. At present, however, the hot gases are conducted by means of a sheet steel breaching directly to the intake of a Sturtevant induced draft fan. This fan has a wheel 9 ft. in diameter by 4 ft. wide, and is mounted on an iron platform located at one side and toward the rear of the boiler settings, so that the breeching outlet discharges directly into the fan intake without making any turns or bends.

The fan discharges into a stub stack 5 ft. in diameter, made of sheet steel, and mounted directly over the fan outlet. A by-pass is provided with suitable dampers so that the fan inlet and outlet can be closed and the gases passed directly to the stack. The top of this stack is only 40 ft. above the grates, but this height has proved sufficient to operate the plant upon light loads without the use of the fan.

The speed of the fan determines the force of the draft, and this speed can be adjusted either by hand or by an automatic valve con-

nected to the main steam header in such a way that as soon as the steam pressure drops the fan engine is speeded up. The draft, therefore, becomes a function of the demand upon the boilers. A draft gage is mounted in a location convenient for the fireman, and the behavior of this part of the plant is under constant supervision. Ordinarily the fan engine turns about 100 r. p. m., but it may be increased to 250 r. p. m. or more, and if occasion should arise to force the boilers to their limit for a period it is possible, by means of the fan and engine which has been installed, to get a draft equal to 2 ins. of water.

ENGINES AND CONNECTIONS

The engines are rated at 750 hp each when running at 150 r. p. m. and taking steam at 150-lb. gage pressure. They are of the vertical Ball & Wood cross-compound Corliss type, with cylinders 21½ ins. and 45 ins. x 24 ins. stroke. Each engine has a governor wheel 96 ins. in diameter and weighing 16,000 lbs., which is mounted between the main bearings. Both the admission and exhaust valves are of the Corliss pattern, and are located in the heads of the cylinders, resulting in the smallest clearance and least length of ports. Each engine is provided with reheating receiver between the high and the low pressure cylinders, which are both steam jacketed. Radiation is prevented by a thick coating of asbestos cement outside of which is fitted an ornamental nickel-plated jacket.

Both engines and generators are of the direct-connected type, but the method of connection departs somewhat from standard practice. The engine shaft extends beyond the main bearings a distance sufficient to receive the hub of a flanged coupling. The revolving fields of the generators are carried on an independent shaft resting in two adjustable bearings through which the generator shaft extends to receive the other half of the flanged coupling. The halves of the couplings on the engine and on the generator are thus in position to be connected by means of three-taper bolts. In this way the generators are built and installed entirely independent of the engines without the usual delay resulting in an effort to secure co-operation between the engine and



SUB-STATION, WAITING AND FREIGHT ROOM

the generator builders. The generators being independent of the engines it is possible to shift the generators from one engine to another in case of accident to either the engines or the generators. This arrangement gives a certain amount of reliability greater than is found with the ordinary independent unit plan, in which the breaking down of an engine or generator cripples the entire unit.

The connecting system described has proved to be a particularly fortunate one for this plant, as it developed in buying the electrical equipment that it would be impossible to secure shipment of the generators inside of eight months, whereas the road itself

would be ready to operate inside of five months. To overcome this difficulty the engines were installed without waiting for the permanent generators, and a temporary belt pulley on an independent shaft was put in place of the bearings of one of the generators, a belt being run through a window to a belted double-current generator installed in a lean-to shed. The consequence has been that the road has been independent of the serious delay in starting usually encountered with enterprises of this character.

CONDENSERS

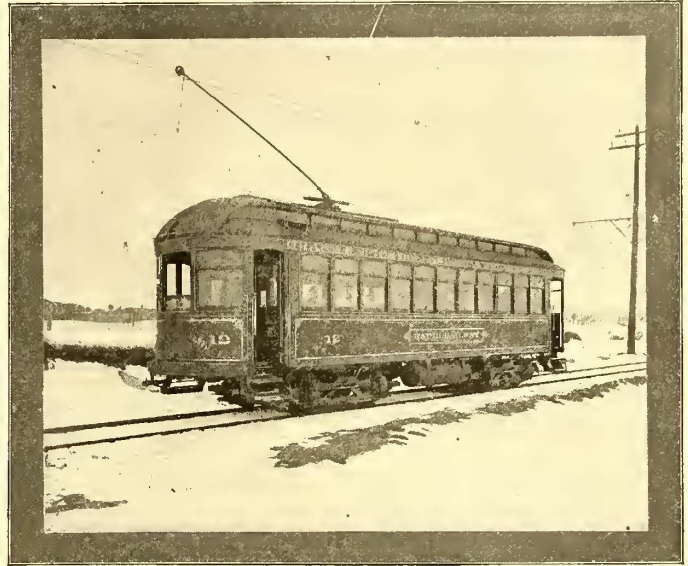
The exhaust from each engine passes down through the floor directly into a Deane jet condenser. A by-pass connection is provided to an atmospheric exhaust through an automatic vacuum break valve and a spiral riveted pipe. The condenser pumps are of the single-cylinder Deane type and are bronze fitted throughout. Each condenser is supplied with injection water through an independent 10-in. pipe extending back to the intake well, so that no difficulty is experienced from the condensers robbing each other. The condensers are in full view from the engine room floor, and are easily and quickly reached by means of a steep iron stairway from the engine room floor to the basement. Extension handles are provided on the injection, discharge and steam valves, however, so that they can be conveniently controlled from the engine room floor.

ELECTRICAL EQUIPMENT

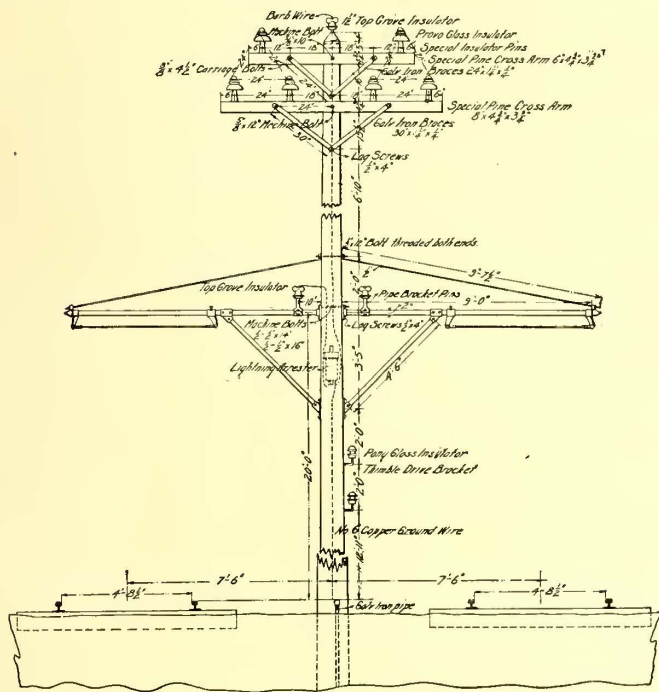
The alternators are of the three-phase, 25-cycle rotary field stationary armature type, of 500-kw capacity, made by the Westinghouse Company, and are provided with armature sliding frame to permit access to all windings for repairs without requiring use of a crane. They have 20 poles, and operate at a speed of 150 r. p. m. The rating is 722 amps. per terminal. The two exciter dynamos are 125-volt 30 kw each, and either is sufficient for supplying full field current for the two 500-kw alternators. The separately excited fields require 120 amps. at 100 volts at full rated current output per terminal, at 380 volts, working on 100 per cent power factor. With an 80 per cent power factor, on full load, an increase

are of the Westinghouse oil-cooled type, and are seven in number (two sets of these each and one spare), each being of 200-kw capacity. The ratio of conversion is 1 to 50. Two fusc cut-outs are placed on the low tension, or machine side, of each transformer, and the usual delta connections are made. These transformers on both primary and secondary windings are arranged for cutting in or out coils or sections for voltage adjustment.

The 300-kw rotary converters are installed in the power house for handling the sections of the line adjacent to the power house. The rotaries are started by an induction motor direct-connected



STANDARD CAR



SECTION OF OVERHEAD LINE AND TRACK

of 20 per cent in field current is required. The alternator armatures are star-connected and of the slotted drum type.

The two direct-connected exciter units and draft fan engines were put on a level and in the same part of the plant to save labor.

The switchboard of 10 panels has 1 exciter panel (for 2 exciters), 2 alternator panels, 2 transformer panels, 2 alternating-current rotary panels, 2 direct-current rotary panels, and 1 direct-current feeder panel. The principal features of the boards are a totalizing, integrating wattmeter, placed on each alternator panel; a double, low-tension bus-bar arrangement for flexible manipulation of alternators with transformers and rotary converters, and separate ammeters for each phase reading to 1200 amps.

Synchronizing lamps and shunt transformers are used when machines are to be synchronized with bus-bars.

The step-up static transformers, which are located in a gallery,

to the armature shaft, and synchronized by means of lamps connected on one side to bus-bars and on the other to the alternating-current side of the rotaries. The switch controlling the starting motor is of the double-throw type, arranged for high and low voltage connections to transformers. Consequently, with one position of the switch the motor develops a speed slightly in excess of the synchronous speed, and with the other position a speed below it. This permits of the proper speed being reached, as indicated by the synchronizing lamps.

Each governor arm of the 750-hp engine, driving the alternator, is equipped with a series-wound 1/4-hp, 125-volt Sprague electric motor for controlling the speed of the engine in synchronizing generators. The control of this motor is from special switches and rheostats on the switchboard.

Lead encased cables are used for connecting the alternator units with the switchboard and transformers, and these are carried under the engine room floor on wooden brackets fastened to the I-beams. The two rheostats for the generator fields rest on suspended shelves in basement.

For some months past a 1000-kw rotary converter has been in operation, pending the delivery of permanent alternators. This machine is belted to special pulley fly-wheel on the engine shaft, and runs at 300 r. p. m. A 5.62-kw 500-volt exciter dynamo is belted to the shaft of the rotary and supplies the fields with current. A three-phase alternating current of 380 volts is delivered to static transformers, and a direct current, approximating 600 volts, or such voltage as follows the departure of the generator from a true sine wave, is delivered to the trolley wire of the line sections adjacent to the power house.

This temporary arrangement has worked well, excepting for the regulation, which has been poor at times, occasioned by the reactive effects.

The station lights, consisting of some 65 lamps, are operated off of a special transformer of 125 volts secondary and 400 volts primary. After the shut-down of the plant at night, should light be required, the exciter dynamo is started and switches transfer this duty to the exciter.

The six high-tension wires, after leaving the step-up transformer, are interrupted at the high-tension board by six single-pole combination fuse switches or circuit-breakers. The lightning arresters on the line are of the Wurts type.

In the station low equivalent arresters are mounted on a marble panel 24 ins. x 65 ins. One single-pole arrester is used on each end of each transmission line.

Static interrupters which resemble transformers in external appearance take the place of the choke coils commonly used, and

are much more effective. On high-tension circuits switching, grounds and short-circuits may produce static effects similar to those of lighting. The static interrupter protects the transformers against sudden static disturbances. The interrupter includes a choke coil in series with the line and the condenser connected between line and the ground—nearer the transformer than the choke coils. The choke coil and condenser are placed in a self-cooling tank. The base dimensions are approximately 20 ins. x 27 ins. Three leads are brought through the top of the case through insulating bushings for connection to line, to transformer and to ground.

The interrupters are single-pole, and three are used for each group of three transformers, the interrupters being placed in the leads of the delta. No switching of live high-tension wires is permissible within the interrupters, except that a transformer may be cut in or out when its high-tension voltage is maintained

building and continue on to Macatawa sub-station, 10½ miles from Zeeland. The six high potential wires comprise two circuits. Although one circuit would suffice for the operation of the two sub-stations, it was deemed best to split or divide the three conductors of the 105,500 cm of aluminum required into six wires of 52,630 cm each, allowing both circuits to be normally run in multiple. In the event of accident by grounding or the breaking of a single wire or wires of one circuit the other is in readiness to carry the load. Although effecting a greater drop in voltage by this makeshift, the cars would be kept in continuous operation with speed slightly impaired. Other combinations of the three-wire circuits are as follows:

Of the two alternators installed at the Jenison power house, one may deliver current over one circuit to the Zeeland sub-station, and the other alternator over the second circuit may operate the Macatawa sub-station, or circuits and sub-stations may be put in

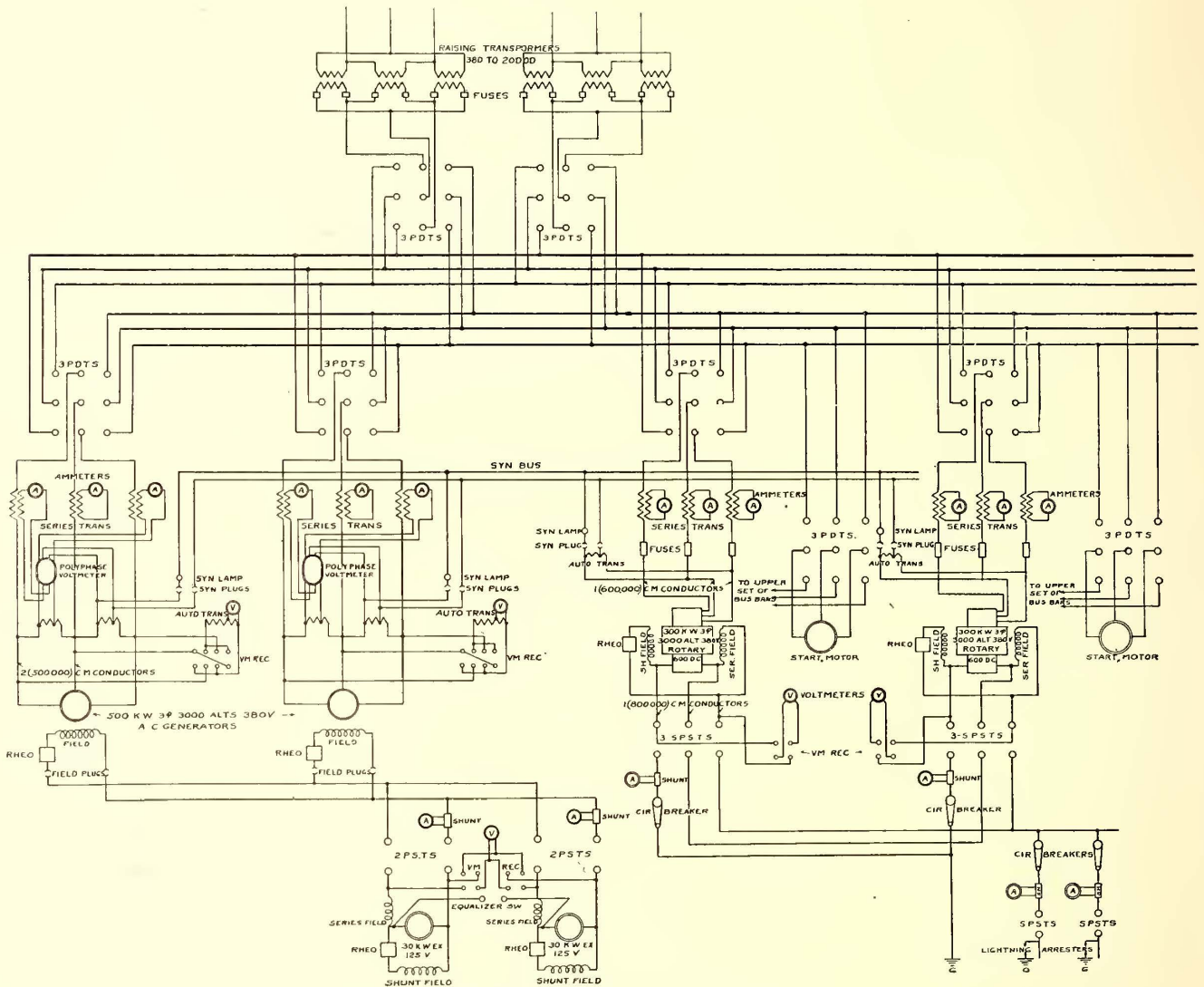


DIAGRAM OF SWITCHBOARD CONNECTIONS

interchangeable by potential on the low-tension winding. In this case the high-tension switching is not dangerous because it produces no change of potential.

It will be noted that the arresters which serve to prevent an abnormal rise of potential due to lightning are placed on the line wires where they enter the stations, and that the interrupters, whose function it is to prevent short-circuits from static disturbances, are placed between the transformers and the transmission line switchboard, so that no switching of high-tension circuits will be done within the interrupters. These lightning arresters are of the most approved pattern, made by the Westinghouse Company, and known as the low-equivalent type.

The wiring for this station consists of rubber-covered wires placed on brown porcelain insulators, supported by standard oak pins. A well-seasoned wooden framework carries the high-tension switches and lightning arresters.

Six aluminum wires of 52,630 circ. mils each leave the Jenison power house, carrying current at 20,000 volts, and follow along the railway tracks easterly to the Zeeland sub-station, 15 miles distant, and at this sub-station these six wires pass through the

multiple with the alternators. Again one of the circuits can be made inoperative, or dead, between the power house and Zeeland, and the multiple combination continue between Zeeland and Macatawa, or vice versa. This arrangement permits of great flexibility, with but comparatively slight increased cost. The two three-wire three-phase alternating-current circuits have the wires 24 ins. apart at the corners of an equilateral triangle. All joints on these circuits are made with McIntire connectors, and the joint has been found very satisfactory. High-tension wires are tied to No. 2 Provo glass insulators, weighing 6 lbs. each, with a diameter across the base of 7½ ins.

The bottom of the insulator is fully 5 ins. above the cross-arm. Glass was preferred to porcelain and has worked effectively. The line received its first current of high voltage in a downpour of rain, and no trouble was given by a single insulator—in fact, no part of the equipment gave any trouble whatsoever. The glass insulators are believed to be much superior to porcelain, and the lower cost is not the least thing to be considered. They do not require a test before being placed in service, and the life without deterioration is longer.

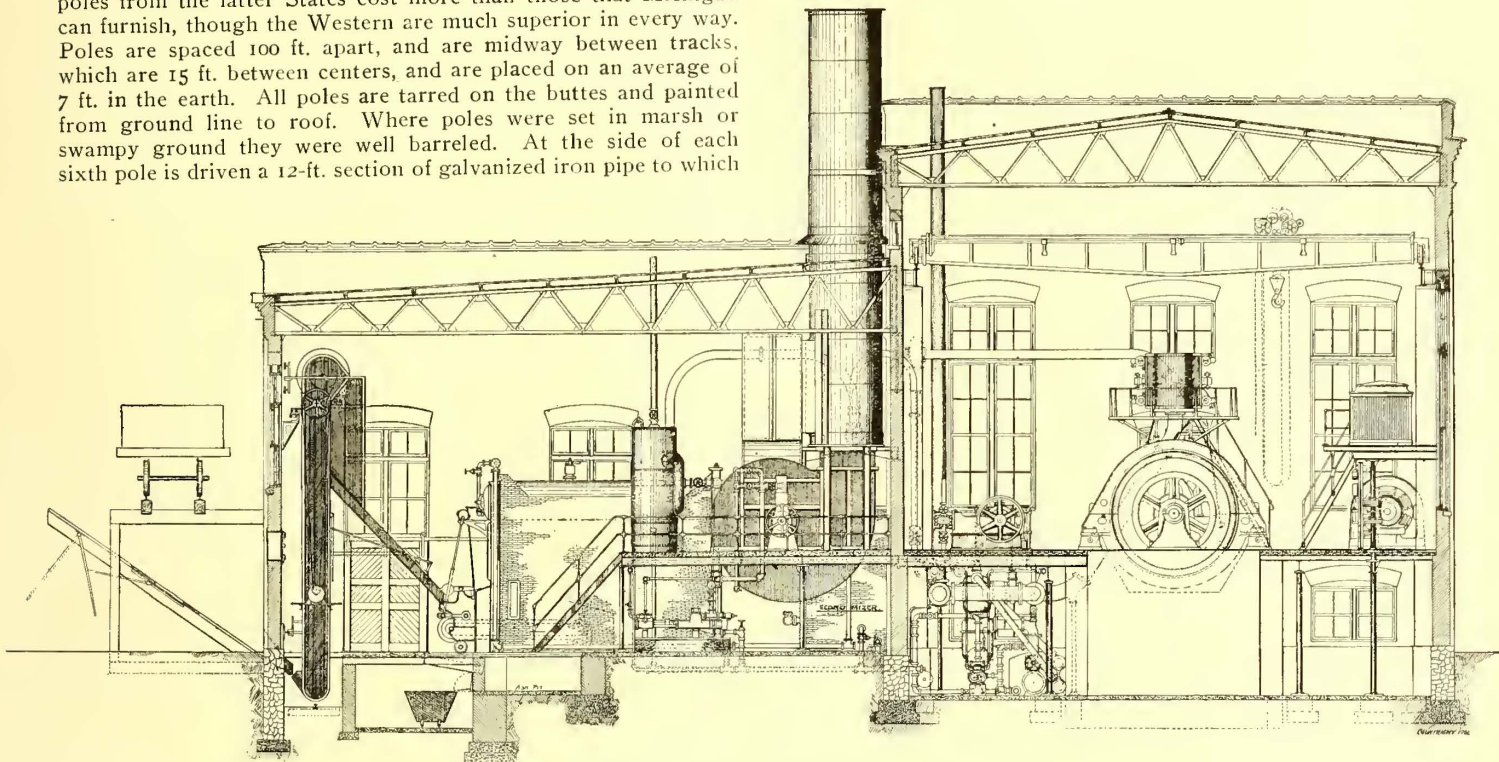
Insulators are placed on special oak pins 14 ins. long, which have been boiled in paraffine oil. These pins are socketed in cross arms 6 ft. and 8 ft. long, and are held firmly in place by plugs, made of 1/4-in. round maple dowelling stuff, which is driven through holes in the cross arm and pin. This method is used in preference to nails. The usual braces, bolted to cross arms and lagged to pole, hold the cross arms in position. The illustration showing the pole with cross arm and bracket construction gives other measurements in detail. The poles are 40-ft. and 30-ft. lengths, with 7-in. tops and 13 ins. in diameter, 6 ft. from the base, and were shipped from L'Anse, a Northern Michigan timber point.

Considerable difficulty was experienced in securing poles that would pass inspection, and the writer's experience the last year with this part of overhead construction indicates that Michigan will soon be barren of suitable timber for 30-ft., 35-ft. or 40-ft. poles. Already the telephone companies are using the Washington and Idaho cedar, and the increased freight charges make the poles from the latter States cost more than those that Michigan can furnish, though the Western are much superior in every way. Poles are spaced 100 ft. apart, and are midway between tracks, which are 15 ft. between centers, and are placed on an average of 7 ft. in the earth. All poles are tarred on the buttes and painted from ground line to roof. Where poles were set in marsh or swampy ground they were well barreled. At the side of each sixth pole is driven a 12-ft. section of galvanized iron pipe to which

thimble, angle, drive-brackets are used for supporting the pony glass insulators. The transpositions of the telephone wires occur every four poles and a straight drive-bracket with a transportation glass insulator is used. The transpositions are made by soldering No. 12 weatherproof insulated copper wire across incoming wires. Thus far the telephone circuit has been very sensitive and worked well, but as soon as a ground occurs the circuit is then too noisy to hear ordinary speech. Telephones are installed at the power house, turn-outs, sub-stations, offices and car houses. A despatcher is employed to direct the movements of the cars by the medium of the telephone line.

The General Electric M. D. type of lightning arrester is installed, and four of these are placed to the mile, giving the most efficient lightning protection for the direct-current circuits.

The trolley wire used is No. 000, Fig. 8 section, supported by the type W cap and cone hangers made by the Ohio Brass Company. A lock washer is inserted between the stud of the hanger and the clincher ears attached.



SECTION OF POWER HOUSE

is connected a No. 6 copper wire, leading directly to the top of pole and tapped into a barb wire carried on a top-groove glass cable insulator. These pipes form a good earth connection for lightning discharges that may strike the high-tension circuits. The barb wire is of large size, and composed of two No. 9 B. & S. wires. This was used in the belief that there would be less danger of breakage than with a smaller size, which in falling would menace the high-tension wires. The top-groove insulator, on which the barb wire rests, is not used for insulation, but after some investigation it was found that this form of support for barb wire was the cheapest and most substantial, consequently it was used in preference to a more simple arrangement.

The first circuit runs continuously without transposition from the power house to Macatawa, while the second circuit receives one complete turn or twist between the power house and the Zeeland sub-station, and between the latter and Macatawa. Direct current feeders of aluminum are also used, and these were supported on the trolley brackets rather than upon an additional cross arm. This method is not only neat and substantial, but less expensive than additional cross arms. The trolley bracket used was of a special pattern, made by the Ohio Brass Company, of Mansfield, Ohio, 2-in. steel tubing being used with heavy reinforced castings. These brackets were fastened to the pole by lag screws and machine bolts, the latter being used where extra strength was required. The brackets are very strong and are specially adapted to interurban high-speed work. It will be noticed that this bracket is braced both from above and below the horizontal arm. Brackets are placed 20 ft. above the rails and 8 ft. 10 ins. from the lower cross arm. On the 40-ft. high-tension poles a distance of 5 ft. 5 ins. is maintained below the telephone circuit and horizontal arm of brackets, with a separating distance of 20 ins. between the two No. 10 copper telephone wires. Steel

Taps, from direct-current feeders to trolley wire, are made on every twelfth pole, and consist of a special mechanical aluminum clamp joint soldered to No. 0 insulated stranded copper cable. This is supported along the horizontal arm of trolley bracket by special insulator clamps, and then passes into feed-in ears attached to the hangers. The direct-current aluminum cables are connected by mechanical joints, the receptacles being compressed on the cable and joined by a lock nut, with right and left hand threads. The usual strain guys are used where necessary, always broken by globe strain insulators. Through several villages that the road passes span construction is resorted to.

Section insulators in both trolley wires bridged by 800-amp. circuit breakers are placed between power house and Zeeland and the latter sub-station and Macatawa. The normal position of these breakers is closed, causing all sub-station rotaries to be in multiple on their direct-current side. Should a heavy short-circuit come upon any section the circuit breakers immediately open, lighting a bank of signal lamps. As a car approaches on the section not affected by the short-circuit the lighted lamps are observed by the motorman, who stops his car, opens the line switch, closes the circuit-breaker, and then closes the line switch. If the circuit breaker does not open again it is understood that the trouble is removed and the car proceeds. Should a disablement or break-down of machinery occur at any sub-station it is possible to continue operation of cars at reduced speed as before mentioned.

The old steam power plant at Macatawa, of 500-kw capacity, has not been dismantled, but will be used during the summer months, when excessive loads on the Holland terminal require its operation.

The main sub-station room at Zeeland has interior dimensions of 39 ft. 8 ins. x 27 ft., and contains two 300-kw Westinghouse

rotary converters, seven 120-kw step-down oil-cooled transformers, six static interrupters and lightning arresters, and six combination fuse switches, also emergency switches for putting the high-tension circuits in multiple. At Zeeland switches for controlling the lines to Macatava sub-station are provided. A seven-panel switchboard is installed, and all wiring under the floor was done with lead-encased cable.

In the gallery, some 7 ft. above the floor, are placed the static interrupters, combination fuse switches and emergency switches. The switches controlling the Macatava sub-station are located on the opposite wall, and are reached by ladder.

The switchboard consists of 2 transformer panels, 2 alternating-current rotary panels, 2 direct-current rotary panels, and 1 direct-current double feeder panel. A swinging bracket holding 2 direct-current voltmeters is attached to the latter panel.

All transformers are earthed and are piped up, with individual valves on each transformer for draining oil from the cases.

CAR EQUIPMENT

Six closed passenger cars 47 ft. long length, and four closed passenger cars 41 ft. long, with motorman's cab on one end only, are already in operation. These cars, with trucks, brakes and motors, weigh 23 tons and 25 tons, respectively, and with the passenger load 4 tons more. The cars were furnished by the Jewett Car Company and the G. C. Kuhlmann Car Company. They are finished in cherry and oak; a smoking compartment is provided on part of the cars. Where a baggage compartment is used small folding seats are distributed about the enclosure for smokers. The windows have very low sills, and are of the Pullman type.

The trucks are of the Peckham 14-A extra strong type, with outside hung brakes, and are equipped with four Lorain Steel Company's No. 34 motors of 50 hp each, with inside hung rigid suspension. The current required to start car is 175 amps., and the normal running current is 135 amps. at 500 volts. These motors are protected by "A-P" circuit breakers. The trolley base installed is of the Bleasdale & Holland type. The cars are heated by the Peter Smith hot-water heaters; some are placed with sheet-iron partition back of the rear seat in the rear end of the car, and others are located in a separate enclosure, adjoining the toilet room. All cars are equipped with the storage air-brake system furnished by the Magann Air Brake Company. The air reservoirs are charged from a large storage tank, set between the two tracks at Jenison, 900 ft. from the power house.

Ham sand-boxes are on all cars and work effectively. The Beverly wheel hand brake is also provided. The car seats are from the Hale & Kilburn Manufacturing Company, and are of the well-known high-back, "walkover" type. The short cars (41 ft.) are provided with rattan seats, and the long cars (47 ft.) have a handsome plush covering. The shorter cars seat 46 people and have wide aisles. The company has recently ordered five 50-ft. passenger cars, which is proof that the long cars are considered best suited for its interurban business. It is confidently expected that trains of two cars will be necessary for handling the summer business. Ultimately the shorter cars will run during that part of the day when travel is light.

The freight equipment consists of three 35-ft. cars. The company also has six 30-ft. gondolas and a Ruggles rotary snow plow.

The rates for freight are low, ranging from 2½ cents to 23 cents per 100 lbs., dependent upon distance, rate basis and classification. The express rates vary from 20 cents for a package weighing not more than 10 lbs. to 45 cents for packages weighing from 50 lbs. to 100 lbs. Over 100 lbs. a rate of 45 cents per hundred is made. These rates, however, vary somewhat, dependent upon the distance, classification and risk, while on the Grand Rapids Railway Company's tracks freight cars operate on a mileage basis.

Village franchises call for a rate not to exceed 1½ cents per mile for carrying passengers, with no fare accepted less than 5 cents, but the steam railroad competitor has recently reduced its rates, and as a result the interurban company is making special rates during certain hours of the day, when the steam road has trains moving between terminal points. For track privileges in Grand Rapids the interurban company receives 2 cents on every fare in either direction on local or interchanged traffic, free transfers being given, and the local Grand Rapids road provides train crew and power, furnishing and maintaining the track.

The Grand Rapids, Holland & Lake Michigan Railway was financed and built by the Detroit Construction Company, of Detroit, of which John Winter is president. The electrical engineering work was under the direction of W. D. Ray, at that time electrical engineer for the Detroit Construction Company.

The contract for the complete power plant, including the build-

ing, was awarded to the Arnold Electric Power Station Company, of Chicago, and this part of the work was done in accordance with plans and specifications submitted by the Arnold Company.

Important Massachusetts Decision

The Board of Railroad Commissioners of Massachusetts reached a decision of far-reaching importance at a hearing held on March 7 in reference to the Waltham Street Railway location. A controversy over the matter has existed for many months between the Waltham and Newton and Lexington and Boston street railway companies. The decision disapproves of the relocation of tracks, and sends the matter back to the board of Aldermen in Waltham. A history of the case is given in the decision as follows:

"Petition of the Waltham Street Railway Company for approval of location of tracks for its railway, and of relocation and revocation of tracks of other railways in the city of Waltham.

"The Newton and Lexington & Boston street railway companies and certain owners of abutting real estate appeared as respondents. The Waltham Street Railway Company was organized early in 1900 under the general law to construct a railway in the cities of Waltham and Newton. At this time there were certain communities in each of these cities which were not served by any street railway, and which were desirous of such accommodation. There was thus left open a field for legitimate enterprise. Locations were secured by the new company in Waltham, and several miles of railway constructed by it.

"The advent of the Waltham company in Newton awoke the companies already operating there to clearer views of public needs and unwonted activity in seeking locations. The Newton company at once offered to build an extension, which up to that time it had declined to build, on the ground that it would not pay. The Waltham company having thus lost the opportunity of reaching Boston by way of Newton, sought to do so by extending its railway in Waltham over two routes—the one through Linden, Beaver and Quince Streets and Trapelo Road to the Waverley line, highways in which there were no existing tracks; the other through Main Street to the Watertown line, a highway in which there was already a single track of the Newton & Boston Company. Locations were granted for both routes, the new company evidently enjoying popular favor. The order granting these locations came before the Railroad Commission for approval. In the decision of that case it was said: 'The location granted parallels for a considerable distance the line long maintained and operated by the Newton company. If it were shown that the purpose of this petitioner was in the main competition involving the paralleling of tracks already sufficient in number, and the division of business with an established company, we should deem the enterprise entirely inconsistent with the public interests. The evils of the unnecessary capitalization sure to follow would more than offset the doubtful advantages of a probably short-lived competition. * * * The question is whether the facts here present a case of that kind. The petitioner has already constructed a considerable system of railway, serving a different public from that reached by the Newton company; and there is ground for the claim that the parallel of the railway of the latter company in Main Street, at least for the distance between Weston and Linden Streets, is a necessary incident of a legitimate extension of its enterprise.'

"On account of irregularities in the proceedings the order of location was disapproved. The present grant is in substance the same as that considered in a prior order. It gives a location to the Waltham company in streets unoccupied by other tracks, and in Main Street parallel to the Newton company.

"As indicated in the former decision, we believe that the grant to the Waltham company of the locations necessary to secure to it a continuous line to the Waverley boundary was justified by the circumstances then existing.

"But the present order, like the former, grants a location to the Waltham company further paralleling the railway of the Newton company in Main Street, from Linden Street to the Watertown line. We are satisfied that the main purpose of this grant was the enlargement of the field for competition. It seems to us that the advantage to be realized from the safer and better operation of the two tracks to Watertown Square, through the ownership and control of one company, decidedly outweighs in this instance any advantage to be gained from competition, and that therefore this location ought not to have been granted without first giving the Newton company the opportunity to change its service from single to double track. We must therefore decline to approve the location in Main Street from Linden Street to the Watertown line. The Newton company now offers to furnish the double-track service, and to make suitable arrangement for carrying patrons

of the Waltham company to Watertown Square without change of cars or increased fare. This offer of the Newton company was not before the Board of Aldermen.

"Much stress was laid by counsel in argument that the tenure of street railway location is practically secure. Though in legal effect such locations are but revocable rights, the law does not contemplate trifling with them or wanton attacks upon the capital invested under them. On the other hand, it does contemplate that the public service which companies undertake shall be properly performed, and to this end the public control over the highways is retained. A location does not forever devote to a company's use a particular place in the streets, or necessarily create a monopoly of the public service. The foundation for confidence in street railway investments is the knowledge that the demand for convenient methods of travel must be a continuing demand, affording a permanent basis for business enterprise, coupled with the faith that fair treatment will be accorded to private interests by those in charge of public rights.

"Objections were made to certain physical conditions created under this grant. These are matters which can readily be remedied, and it is to be taken for granted that they will be remedied by suitable action on motion of the parties interested.

"It has been contended that the action of the Board of Aldermen in imposing upon the Newton company certain expenditures in connection with the relocation of its tracks is unreasonable and illegal. The statute authorizes an apportionment of the expense of alteration of tracks between the parties, as justice may require. No company can properly build a railway upon the assumption that it will never have to change the position of its tracks. To the extent that this order imposes upon the Newton company simply the expense necessarily incident to the moving of its track it is not open to criticism. It has been contended that the provisions of law relating to acceptance of locations apply to cases of alteration of tracks. Such a construction would destroy the usefulness of this provision. The attitude of the Newton company at the time of the grant has been kept in mind."

The Board recommends a traffic arrangement whereby but one line be operated through Main Street between Linden and Weston Streets.

Polyglot Circuit-Breaker Catalogue

The Cutter Electrical & Manufacturing Company, of Philadelphia, maker of Keystone instruments, has just published a "polyglot catalogue" descriptive of the I. T. E. circuit-breaker. This is probably the most complete circuit-breaker catalogue ever published, and the translation of it into French, German and Spanish has occupied more than a year. The difficulty of translating technical electrical terms into foreign languages, particularly into Spanish, is very great, and no effort or expense has been spared by the company to make the work as free from error as possible. The information given is very complete, and includes the dimensions in inches centimeters, and the weights—net, tare and gross—in pounds, and also in kilograms. Only those who have had experience with compilations of this kind understand the care required in publishing such a catalogue, and can appreciate the importance of it. It should be of great use to the company's foreign customers.

A New Railway Supply Company

C. J. Harrington, of New York, who is well known to all railway men throughout the country, and has been connected with the supply business for a large number of years, has opened an office for himself at 15 Cortlandt Street. Mr. Harrington is now prepared to take orders for machinery and general supplies of all kinds for electric railway, light and telephone service. Among other manufacturers whom Mr. Harrington will represent, he will have the exclusive territorial agency for the Heil Rail-Joint Welding Company, of Milwaukee; the General Equipment Company, of Camden, N. J.; the United States Fender Company, of Camden, N. J.; and the New Century Car-Heater Company, of Jersey City, N. J.

Storage Battery Cars in New York

In a list of the lines in New York City, to be changed to electric traction under the new plans of the Metropolitan Street Railway Company, the Thirty-Fourth Street crosstown line, which is now using storage batteries, was included, with the note that this would probably be changed to the conduit system. This, however, was erroneous, as the company is not planning any change in the motive power of this line.

Old Age and Disability Pensions on the Metropolitan Street Railway Company

There was posted on March 6 in the twenty-six car houses, stables and power houses of the Metropolitan Street Railway Company throughout Manhattan a notice from President Vreeland to all employees, announcing the establishment of a pension system for the superannuated employees of the concern. This is the final step in the system inaugurated by President Vreeland when he took charge of the Metropolitan for elevating the status of its 15,000 employees.

The notice, which sets forth the main features of the system, is as follows:

METROPOLITAN STREET RAILWAY COMPANY,
Office of the President.

NEW YORK, March 6, 1902.

TO ALL EMPLOYEES: The plan I have long had in mind of establishing a pension system for the relief of the superannuated employees of this company, members of the Metropolitan Street Railway Association, whose annual maximum wages have not exceeded \$1,200 per annum, has finally been perfected and will be put into effect on or before July 1. The specific regulations are now being drafted, and will, in due course, be distributed for your further information.

This pension system provides for voluntary and involuntary retirement of all employees so included, between the ages of 65 and 70, after twenty-five years service in the Metropolitan Street Railway Company or any of its constituent companies. Employees benefited by the system will be of two classes:

First.—All employees who have attained the age of 70 years, who have been continuously in such service for twenty-five years or more, preceding such date of maturity; and

Second.—All employees from 65 to 69 years of age, who have been twenty-five years or more in such service, who in the opinion of the trustees of the pension have become physically disqualified.

All employees of 70 years will be considered to have attained a maximum age allowed for active service, and will be retired by age limit, while those whose ages range from 65 to 69 may, upon examination, be retired under pension if found incapable.

The pension allowance to such retired employees shall be upon the following basis:

(a).—If service has been continuous for thirty-five years or more, 40 per cent of the average annual wages for the ten previous years.

(b).—If service has been continuous for thirty years, 30 per cent of the average annual wages for the ten previous years.

(c).—If service has been continuous for twenty-five years, 25 per cent of the average annual wages for the ten previous years.

The fund from which payments will be made will be appropriated each year by the company and employees will not be required to contribute to it.

My object in establishing this department is to preserve the future welfare of aged and infirm employees and to recognize efficient and loyal service.

H. H. VREELAND,

President and General Manager.

In speaking of the matter President Vreeland said:

"This plan has been in contemplation for a long time—in fact I had it in mind when I took charge of the twenty odd street railways making up the present Metropolitan system. I then found that there was a singular lack of unity of interests among the men employed on the various lines throughout the city, due to the slipshod manner in which this force was recruited and to the lack of any means of social intercourse.

"It was apparent that among men brought together by the recruiting methods then in existence social intercourse for mutual benefit and improvement was practically impossible on account of the brevity and uncertainty of the tenure of employment, and my first efforts were directed to correcting this instability. I found that men were employed in a majority of instances through political influences, and with very little reference to their capacity or adaptability to the work they were expected to perform, with the natural result that discharges among 4000 men amounted to about 300 a month. Immediately a reformation in the recruiting methods was inaugurated and the Metropolitan began to select its labor in the open market, where it secured the best that was offered, making character, health and intelligence the only qualifications necessary in order to enter the ranks.

"Within a year the results of this reform began to manifest themselves in all directions, and while the number of operatives was rapidly increased, the number of discharges steadily decreased, until they were diminished to as many in a month as had previously occurred in a single day.

"Coincident to the reform in recruiting there was developed a system of discipline at once rigid and equal. No man was to be deprived of his employment without a hearing, and for reasons which were explained to him, and the arbitrary power of small officials was curtailed and centralized. My men grew in dignity, responsibility and efficiency, and the time was ripe for furnishing some means of social amusement and benefit. Then came into existence, through the action of the men themselves, the Metro-

politan Street Railway Association, which is justly regarded as the most unique organization of its kind in existence. It is unpatronized by the corporation whose property it operates, it pays its own bills, nurses its own sick, and buries its own dead on a system devised by a board of trustees of its own election, and is in fact the cheapest and promptest known insurance. During the brief term of its existence it has collected, distributed and invested (in the securities of the properties its members operate) over \$100,000.

"Its main objects are to secure to its members free medical attendance, one-half of the wages in case of illness, and \$300 in case of death. These purely material benefits, to say nothing of the monthly entertainments, theatrical, athletic, musical and instructive, are secured to members at an expense of 50 cents a month.

"It has a library of over 1500 books, and there are pool tables and other means of recreation, representing an outlay of about \$8,000.

"The history of this association furnishes evidence, if any be needed, that freedom and opportunity with workmen will inevitably bear more fruit than sympathetic patronage.

"This reform in the recruiting methods of the Metropolitan Company, steadying as it did the employment in a single community of over 15,000 able-bodied wage-earners, was an immense civic service, to which very little attention has been paid. If one considers the fact which census statistics lately promulgated that every able-bodied workingman has at least six individuals depending on him for support, and that we have over 15,000 men in our employment, some idea can be had of the steadying influence at work among a class which ten years ago was denominated 'miscellaneous labor,' and which is now organized into a craft. Broadly viewed, the application of this pension system will affect, directly and indirectly, at least 105,000 persons in the City of New York."

In discussing the class of men that are to be benefited by this pension system, Mr. Vreeland said that in the Metropolitan Street Railway Company all the non-laborious and desirable positions in the various car houses and stables—switching-tending, transfer agencies and the like—are given, as a matter of rank, to those longest in the service, so that between the time of a man's highest efficiency (during which the association takes care of accidents to life and health) and the age of retirement the company looks out for him by adjusting him in the system to work he can comfortably and efficiently perform.

Ohio Roads Cannot Claim Steam Privileges

The Ohio Supreme Court has upheld Judge Ferris of the Hamilton County Probate Court and the judges of the Circuit Court, in a decision to the effect that a street railway cannot claim steam railroad privileges of any sort. The case was that of the Cleveland & Cincinnati Traction Company against the city of Cincinnati. The corporation was organized by Hon. Powel Crosley, of Cincinnati, to build a road from Cleveland to Cincinnati, and it undertook to condemn a right of way over Spring Grove Avenue to Longworth and Vine streets, Cincinnati. The city resisted on the ground that the company was really a steam railroad, no matter what the incorporation papers showed. The Probate Court held against the company, and the judgment was affirmed in the Common Pleas and Circuit courts. Mr. Crosley maintained that his company was organized as a railroad company, steam railroad, so-called, though steam is not expressly named as a motive power anywhere in the statute. He claimed it was authorized by section 3283 to purchase and to receive by donations private property for rights of way.

By section 3281 it was authorized, on failure to agree with the owner to condemn private property for rights of way, etc., and it was authorized by section 3283, on failure to agree with the public authorities, to condemn the right to use and occupy public property, to use the language of the statute, "any public street, alley, way or ground of any kind, or any part thereof," in the Probate Court.

It is said that unless Mr. Crosley can prevail on the Board of Legislation, his company is barred from the streets of Cincinnati in view of the decision.

New York Railroad Club

The next regular meeting of the New York Railroad Club will be held at 349 Madison Avenue, on Thursday, March 20, at 8 p. m. The paper of the evening will be entitled "Some Principles of Railway Regulation," and will be presented by H. T. Newcomb, editor of *The Railway World*.

The Decision in the Detroit Three-Cent Fare Case

The following is a complete report of the decision, referred to in our last issue, of the Supreme Court of the United States, in the case of the city of Detroit, William C. Maybury, Mayor, and Charles Flowers, Corporation Counsel, appellants, vs. The Detroit Citizens' Street Railway Company. This is popularly known as the "3-cent fare case," and is in favor of the company. The case came before the Supreme Court in the form of an appeal from the Circuit Court of the United States for the Eastern District of Michigan.

The opinion which was delivered March 3, 1902, was as follows:

OPINION

The bill in this suit was filed by the railway company for the purpose of obtaining an injunction to restrain the city of Detroit and the individual defendants from enforcing certain ordinances of the Common Council of the city, adopted in 1899, reducing the rates of fare on the various city railways of the complainant and providing for transfers of passengers from one route to another on payment of one fare of 5 cents, on the ground that such ordinances were violations of the Federal Constitution, because they impaired the obligation of contracts theretofore entered into between the city and the various predecessors of the complainant. The Circuit Court granted a decree perpetually enjoining the defendants as prayed for, and they have appealed therefrom to this court.

As further ground for equitable jurisdiction, the complainant, after setting up in the bill its alleged contracts with the city, and the attempted violation thereof by the latter, made the following averments:

Your orator further shows unto the court that as owner and lessee it is now engaged in the operation of upwards of 135 miles of street railways in the streets of the city of Detroit; that in such operation it has in use upwards of 400 street cars, which are propelled by electricity, and has in its employ, engaged in such operation, upwards of 1000 men as motormen and conductors; that it carries an average of ———* thousand passengers per day over the lines owned and operated by it; that under and by virtue of the provisions of said ordinances, Exhibits A, B, C, D and E, and the obligation of your orator to carry such passengers as may offer themselves for carriage, it will be subjected to innumerable demands upon the part of the traveling public to sell to such persons as may make such demands tickets in accordance with the provisions of said ordinances, Exhibits A, B, C, D and E, and to issue as provided and required thereby, and to accept and carry such passengers and transfer the same at the rates of fare fixed by said ordinances; that on your orator's refusal to comply with such demands and requests your orator may be subjected to numerous actions at law by persons so refused, and to annoyance, litigation and loss by reason thereof; that the said city of Detroit will seek and now seeks and threatens and intends by such power and authority as it may possess and by vexatious legal proceedings to compel your orator to comply with the provisions of said ordinances, Exhibits A, B, C, D and E, and as a result your orator will be put to a great loss, damage, hindrance and annoyance in the transaction of its business, which it is entitled to carry on without such suits, litigation, actions, annoyance, hindrance, loss and damage.

That, in full reliance upon its right to charge the full rates of fare fixed by the various contracts and grants hereinbefore referred to, and for the purpose of procuring such money as it was necessary that it should have for the construction, maintenance, repairing, and reconstruction and operation of the various lines of railway hereinbefore described, it issued its bonds and borrowed thereon the money so needed; that your orator and its predecessors have issued for the purposes aforesaid bonds amounting in the aggregate to \$8,200,000, payable in gold coin, with semi-annual interest at the rate of five per cent per annum; that many of said bonds mature and will be due and payable within the next three years, and it will be necessary for your orator to borrow a considerable amount of money to assist in the payment and retirement of said bonds, by the issue of bonds of the same character; that all of said bonds outstanding are secured by mortgages given at various dates, by the terms of which all of the property, rights, privileges and franchises of your orator, its lessors and predecessors, including the franchises or rights fixed by the said various contracts and grants to charge the rates of fare therein named, together with all the tolls, fares, issues, earnings and profits arising therefrom, have been mortgaged to trustees therein named for the use and benefit and security of the holders of such bonds; that said bonds have been sold to parties purchasing the same in the full faith and belief that your orator, its lessors and predecessors and grantors, had the right to charge the full rates of fare fixed by the various contracts and grants without any right upon the part of the said city of Detroit, or of any other person, corporation, or authority to interfere with, lessen, reduce or impair the same, and, the said right to have and receive the rates of fare so fixed being so mortgaged as a part of the security for the payment of said bonded indebtedness, the action of said city by the adoption of the ordinances, Exhibits A and B, is an impairment of the obligation of said contract as against the rights of said bondholders under and by virtue of the security created by said various mortgages and in contravention of said section 10 of article 1 of the Constitution of the United States.

Complainant also averred in its bill the granting of consent by the city to its predecessors to lay tracks in the streets and charge

* Blank in official copy of decision.—[EDS.]

tolls at the rates named in certain ordinances, for transporting passengers, and the due assignments by the various companies of all such rights, by purchase or lease to the complainant, and the defendant by its answer makes no issue as to the validity of such assignments or the ownership by complainant of all the interests of the former companies in the contracts and ordinances set forth in the bill.

The answer admits the passage by the Common Council of the ordinances of 1899, reducing the rates of fare on the roads operated by the complainant, and also admits that the city intends to compel the complainant to comply with the provisions of such ordinances, which the defendants aver are valid because, as they claim, the former ordinances did not constitute a contract as to rates of fare which could not be altered by the city.

This litigation arises out of the different construction placed by the parties upon the statutes of Michigan, called respectively the Tram-railway Act and the Street-railway Act, and the various amendments of those acts, and also out of the different claims of the parties as to the character and validity of the ordinances passed by the Common Council subsequently to the passage of those statutes.

The Tram-railway Act was passed in 1855, and the Street-railway Act in 1867. Prior to the amendment in 1861, made to the former act, there was no authority for the incorporation of street railways, and in the year named that act was amended by adding sections 33 and 34, which are as follows:

Sec. 33. It shall be competent for parties to organize companies under this act to construct and operate railways in and through the streets of any town or city in this State.

Sec. 34. All companies or corporations formed for such purposes shall have the exclusive right to use and operate any street railways constructed, owned or held by them: Provided, that no such company or corporation shall be authorized to construct a railway under this act through the streets of any town or city without the consent of the municipal authorities of such town or city, and under such regulations and upon such terms and conditions as said authorities may from time to time prescribe.

In 1867 the above section 34 was further amended by adding an additional proviso, as follows:

Provided further, that after such consent shall have been given and accepted by the company or corporation to which the same is granted, such authorities shall make no regulations or conditions whereby the rights or franchises granted shall be destroyed or unreasonably impaired, or such company or corporation be deprived of the right of constructing, maintaining and operating such railway in the streets in such consent and grant named pursuant to the terms thereof.

These sections of the Tram-railway Act, it will be seen, made no special provisions as to rates of fare, and there were no other sections of the act which did. The last amendment, above set out, of section 34 was passed March 27, 1867, or twenty-two days after the passage of the original Street-railway Act, March 5, 1867.

The provisions of the Street-railway Act material in this controversy are as follows:

Sec. 13. Any street railway corporation organized under the provisions of this act may with the consent of the corporate authorities of any city or village given in and by an ordinance or ordinances duly enacted for that purpose and under such rules, regulations and conditions as in and by such ordinance or ordinances shall be prescribed, construct, use, maintain and own a street railway for the transportation of passengers in and upon the lines of such streets and ways in said city or village as shall be designated and granted from time to time for that purpose in the ordinance or ordinances granting such consent, but no such railway company shall construct any railway in the streets of any city or village until the company shall have accepted in writing the terms and conditions upon which they are permitted to use said streets; and any such company may extend, construct, use and maintain their road in and along the streets or highways of any township adjacent to said city or village upon such terms and conditions as may be agreed upon by the company and the Township Board of the township, which agreement and the acceptance by the company of the terms thereof shall be recorded by the Township Clerk in the records of his township. * * *

Sec. 14. After any city, village or township shall have consented as in this act provided to the construction and maintenance of any street railways therein, or granted any rights and privileges to any such company, and such consent and grant have been accepted by the company, such township, city or village shall not revoke such consent, nor deprive the company of the rights and privileges so conferred.

Sec. 15. Any street railway company may also purchase and acquire at public or private sale, whether judicial or otherwise, or may hire any street railway in any city, village or township owned by any other corporation or company, together with the real and personal estate belonging thereto, and the rights, privileges and franchises thereof, and may use, maintain and complete such road, and may use and enjoy the rights, privileges and franchises of such company and upon the same terms as the company whose road and franchises were so acquired might have done. Every railway company may also purchase, hold, own or take upon lease such real estate, barns, stables, buildings, fixtures as may be necessary for the use and business of their road; and the whole or any part thereof, together with their railway fixtures, property and appurtenances, rights, privileges and franchises, may sell, lease, dispose

of, pledge or mortgage whenever the corporation may deem it expedient so to do.

Sec. 20. The rates of toll or fare which any street railway may charge for the transportation of persons or passengers over their road shall be established by agreement between said company and the corporate authorities of the city or village where the road is located, and shall not be increased without the consent of such authorities.

Sec. 29. All companies and corporations heretofore organized in this State for the purpose of building and operating street railways under the statutes then in force shall have the same powers, rights, protection and privileges and shall be subject to all of the liabilities as are hereby provided for companies and corporations organized under the provisions of this act.

Section 30 in substance provides that all companies and corporations thereafter formed for street railway purposes must be organized under this act.

Some of the railroads of which the complainant is the owner or lessee were organized under the Tram-railway Act and some were organized under the Street-railway Act of 1867. The Detroit Street Railway Company, now owned by the complainant, was organized under the Tram-railway Act, and the city adopted an ordinance assenting to the laying of tracks through the designated streets of the city on Nov. 24, 1862. Section 1 of the ordinance provides:

Sec. 1. That consent, permission and authority is hereby given, granted and duly vested in Eben N. Wilcox and his associates, who may be approved by the Council, their successors and assigns, organized into a corporation, under laws of the State of Michigan, as aforesaid, to lay a single or double track for a railway, with all the necessary and convenient tracks for turnouts, side tracks and switches, in and along the course of the streets of, and bridges in, the city of Detroit, hereinafter mentioned, and the same to keep, maintain and use, and to operate thereon railway cars and carriages, during all the term hereinafter specified and described, and in the manner and upon the condition set forth in this ordinance.

The following sections then provide for the streets in which the rails are to be laid, the manner of laying, whether double or single track, and various other matters not essential to enumerate.

Section 8 reads as follows: "The rate of fare for any distance shall not exceed 5 cents in any one car, or on any one route named in this ordinance, except where cars or carriages shall be chartered for specific purposes: Provided, cars so chartered shall not be considered regular cars, within the meaning of the preceding section.

Section 20 limits the powers and privileges conferred by the ordinance to thirty years from and after the date of its passage.

On Nov. 14, 1879, an ordinance was passed supplementary to the one passed on Nov. 24, 1862, which provided for extensions by the railway company of its tracks through various other streets of the city, and also provided, among other things, for a special tax on the gross receipts of the several lines of railway operated by the company, payable to the city, which tax was to be in lieu of license or other taxes and charges under the existing ordinances.

Section 5 of the supplemental ordinance provided that the powers and privileges conferred and the obligations imposed on the railway company, by the ordinance passed Nov. 24, 1862, and the amendments thereto, should be thereby extended and limited to thirty years from date (Nov. 14, 1879).

Section 6 provided that the ordinance should take immediate effect when written acceptances of the terms thereof were filed in the office of the City Clerk of Detroit by the different companies controlled by the Detroit City Company; and it also provided that all ordinances or parts of ordinances in conflict with the provisions thereof were thereby repealed; and all ordinances and parts of ordinances not in conflict therewith were thereby affirmed and continued in force. The acceptances were subsequently duly filed in the City Clerk's office.

A similar ordinance to that of Nov. 14, 1879, was passed on June 30, 1880, relative to the Fort Wayne and Elmwood Street Railway Company, confirming and extending for thirty years its grant under the ordinance of Jan. 31, 1865. Similar ordinances were passed in favor of other lines which had been organized under the Tram-railway Act and its amendments.

And ordinances of the same nature were passed relating to the companies organized under the Street-railway Act of 1867.

The original ordinance under which the city gave consent to the laying of the rails of the Grand River Street Railway was adopted on May 1, 1868, and the section providing for the rate of fare is the same in language as section 8, in the foregoing ordinance relative to the Detroit Street Railway.

The ordinance relating to the Dix Avenue Railway provided in section 6 "that the rate of fare for a single trip shall not exceed 5 cents for any distance within the city limits." Similar language was used in section 5 of the ordinance approved by the Common Council July 13, 1886, relating to the Highland Park Railway. The eighth section of the ordinance approved by the Common Council Jan. 31, 1868, with regard to the Fort Wayne and Elm-

wood Railway Company, provides that "the rate of fare for any distance shall not exceed 5 cents in any car."

These ordinances embrace the various railroads now owned or leased and operated by the complainant, and it is in them, taken in connection with the statutes already referred to, that the complainant finds the contracts or agreements as to the rate of fare, the obligation of which agreements it avers is impaired by the later ordinances passed in 1899.

The charter of the city of Detroit, approved June 7, 1883, by sections 121 and 122, clothed the Common Council with power over the streets, highways and alleys, to establish, open, widen, extend, straighten, alter, vacate, etc., and generally to control and regulate the manner in which the highways and streets, avenues, lanes, alleys, public grounds and spaces within the city should be used and enjoyed.

The constitution of the State of Michigan, article 15, section 1, provides that—

Corporations may be formed under general laws, but shall not be created by special act, except for municipal purposes. All laws passed pursuant to this section may be amended, altered or repealed.

The various ordinances which have been referred to contain certain reservations of the right to alter, etc., which are thus worded: Section 19 of the grant of Nov. 24, 1862, to the Detroit City Railway is as follows:

It is hereby reserved to the Common Council of the city of Detroit the right to make such further rules, orders or regulations as may from time to time be deemed necessary to protect the interest, safety, welfare or accommodation of the public in relation to said railways.

Section 7 of the grant of Nov. 14, 1879, re-enacting and extending the grant of Nov. 24, 1862, is as follows:

"The right to amend or appeal this ordinance in case of its violation by said company or companies is expressly reserved."

Section 3 of the grant of Jan. 5, 1885, authorizing the Brush street line, is as follows:

It is hereby reserved to the Common Council of the city of Detroit the right to make such further rules, orders or regulations as may from time to time be deemed by the Common Council necessary to protect the interest, safety, welfare or accommodation of the city and public in relation to said railway.

Section 3 of the Trumbull avenue line grant of July 31, 1865, is a literal copy of the one last quoted.

Section 18 of the grant to the Grand River Street Railway of May 1, 1868, is as follows:

It is hereby reserved to the Common Council of the city of Detroit the right to make such further rules, orders or regulations as may from time to time be deemed necessary to protect the interest, safety, welfare or accommodation of the public in relation to said railways.

The same reservation was contained in section 4 of the grant of June 27, 1885, of the Myrtle Street route.

And section 3, of the grant of Aug. 3, 1888, relating to the Grand River line, is the same.

Section 19, of the grant of Jan. 31, 1865, to the Fort Wayne & Belle Isle Company is as follows:

"It is hereby reserved to the Common Council of the city of Detroit the right to make such further rules, orders or regulations as may from time to time be deemed necessary to protect the interest, safety, welfare or accommodation of the public in relation to said railways."

Mr. Justice Peckham, after making the foregoing statement of facts, delivered the opinion of the Court.

A question has arisen at the outset as to the jurisdiction of a court of equity over a case like the one now presented. Assuming the right to relief in some form, has the complainant a plain and adequate remedy at law, or is the case such in its nature and in the relief demanded as would be cognizable in a court of equity? The foundation of the right of action lies in the alleged invalidity of the ordinances of 1899, reducing the rates of fare on the railways of the complainant, because, as averred, those ordinances are in violation of the Federal Constitution, as impairing the obligation of contracts between the parties already existing, and therefore the claim is made that they should not be permitted to be enforced against the complainant where such enforcement might result in a multiplicity of suits, or in harassing and expensive litigation.

The averments in the complainant's bill upon this subject, which are set forth in the above statement of facts, show the additional and special grounds upon which the jurisdiction in equity is invoked. Of course, if the complainant obey these ordinances, no controversy can arise, but if in good faith it believe them to be invalid and hence not binding upon it, and without resorting to the courts for equitable relief it refuses to obey them, the consequences may be not only embarrassing but may lead to much unnecessary and expensive litigation. Continuous demands for the tickets mentioned in the ordinances at the reduced price therein provided for may be made by passengers while in the cars of complainant, and they may refuse to pay fare at the old rate, and may carry such refusal to the point of suffering removal from the cars

on account of the non-payment of fare. What amount of force would be necessary in the opinion of the various passengers to demonstrate that their going was not voluntary would of course give rise to disputes between them and the conductors, and would possibly, if not probably, lead to frequent breaches of the peace in the course of these attempts at removal. If not removed, then the passengers would either pay no fare or the complainant would have to accept the fare as provided in the ordinances of 1899, and that would be the same in fact as submitting to their enforcement.

The roads operated by complainant are also indebted to an extent of over \$8,000,000, secured by mortgages upon the railways, their franchises, rights and privileges, together with the tolls and fares, earnings and profits arising therefrom, and some of this indebtedness is soon to mature, and it is admitted that the bonds issued as evidence of such indebtedness and secured by its mortgages were so issued and sold to and purchased by the holders thereof in the full faith and belief that the various roads represented by the complainant had the right to charge the rates of fare fixed by the ordinances already mentioned; such belief being based upon the existence and terms of such ordinances.

The ability of the complainant to renew or extend its mortgage indebtedness might depend upon belief in the validity of the contracts as to the rates of fare agreed upon before the attempted alteration thereof by the ordinances of 1899. The immediate enforcement of these later ordinances might result in such a decrease of income as to seriously imperil the solvency of the complainant. An equitable action like this would certainly be more adequate and offer more effective and immediate relief than for the complainant to await the various actions at law to which it would otherwise be subjected by the defendants and the individuals demanding the reduced rates for transportation.

The Mayor and Corporation Counsel have, as is seen, been joined with the city as defendants in the suit. The reason for the joining of the individual defendants would seem to be that they are the officers upon whom would devolve the execution of the ordinances passed by the Common Council, and in the answer of the defendants it is admitted that they intend to enforce obedience by the company to such ordinances. The case is similar in some of its aspects to that of *Smith vs. Ames*, (169 U. S. 466.) It is true there are no penalties fixed in the ordinances for disobedience to their commands on the part of the company, but the bill shows that there are a large number of passengers carried over the roads of the complainant daily, amounting to many thousands, each of whom would have the right to demand transportation at the rates provided for by the ordinances in case they were valid. As is said in *Smith vs. Ames* (page 518): "The transactions of a single week would expose any company questioning the validity of the statute to a vast number of suits by shippers, to say nothing of the heavy penalties named in the statute. Only a court of equity is competent to meet such an emergency and determine, once for all, and without a multiplicity of suits, matters that affect, not simply individuals, but the interests of the entire community as involved in the use of a public highway and in the administration of the affairs of the quasi-public corporation by which such highway is maintained." While this is not such an extreme case, and there are no penalties provided in the ordinances for disobedience, yet the same principle applies.

It is a matter of general public interest, as well as of vital importance to the complainant, that the question involved in this litigation should be determined at the earliest possible moment, and once for all, and thus a multiplicity of suits and other complications prevented.

Taking all these facts into consideration, and bearing in mind that the answer does not set up any defense of the lack of jurisdiction of a court of equity over the subject matter, and does not insist that there is an adequate and plain remedy at law (and no such objection has been taken at any time, and has not been insisted upon before us), we do not feel compelled, under the peculiar circumstances of the case, to ourselves take notice of it.

It is not such a case as on its face equity could have no jurisdiction over, such as an action to recover damages for an assault, or for a libel or slander, but the question between the parties as to the validity of various ordinances and the right of the city to enforce them, involving, as they may, the credit and possibly the solvency of the complainant, and taking into consideration the public interests involved in a speedy and final determination of the question, all these, as well as other facts already mentioned, we think, make out a case for following the general rule, that a defense of this nature will not be recognized where it has not been taken by answer or in any other manner and is not insisted upon on the hearing before the court. (*Reynes vs. Dumont*, 130 U. S. 354; *Kilbourn vs. Sunderland*, Id. 505; *Brown vs. Iron Co.*, 134 U. S. 530.)

We do not mean to assert that in all cases of this nature, involving simply the validity of a subsequent ordinance or law, a court of equity would be the proper forum, but confine our decision to the special facts of this case, including the fact that no objection has been taken to the jurisdiction of the court at any stage of the litigation, and is not now raised by any party to the same.

This brings us to a consideration of the questions argued at the bar.

In furtherance of the claim by defendants that the ordinances of 1899 reducing the rates of fare are valid, it is urged that express authority from the Legislature is required to enable the Common Council of a city to pass ordinances such as those described in this case, providing for the consent of the city to the laying of tracks and the running and operation of a railroad through its streets and the fixing of rates of fare, and that no such power was granted in this case, and if there were, there has been no agreement made by the passage of the ordinances referred to in the statement of facts. It may be conceded that clear authority from the Legislature is needed to enable the city to make a contract or agreement like the ordinances in question, including rates of fare. But there can be no question in this court as to the competency of a State Legislature, unless prohibited by constitutional provisions, to authorize a municipal corporation to contract with a street railway company as to the rates of fare, and so to bind during the specified period any future Common Council from altering or in any way interfering with such contract. (New Orleans Gas Company vs. Louisiana Light Company, 115 U. S. 650; New Orleans Waterworks Company vs. Rivers, Id. 673; St. Tammany Waterworks vs. New Orleans Waterworks Company, 120 Id. 64; Walla Walla City vs. Walla Walla Water Company, 172 Id. 1, 9; Los Angeles vs. Los Angeles City Water Company, 177 Id. 558, 570; Freeport Water Company vs. Freeport City, 180 Id. 587, 593.) The contract once having been made, the power of the city over the subject, so far as altering the rates of fare or other matters properly involved in and being a part of the contract, is suspended for the period of the running of the contract.

It is, however, urged that the terms employed in the ordinances under which the complainant runs its different lines of street railways are not sufficient to constitute contracts, which may not be altered at the pleasure of the Common Council. It is said that at least in regard to the ordinances relating to those companies organized under the Tram-railway Act no contract can be found in them, as there was no special provision in that act for an agreement between the city and a company applying for the use of its streets, as to the rates of fare, and therefore a statement in an ordinance upon that subject would amount to no more than a license which might be altered or revoked at any time; and that if the language were a contract, it was in the power of the Common Council to alter or abrogate it under section 34 of the Tram-railway Act.

It will be seen that under section 34 of the Tram-railway Act, as it was enacted in 1861, a railway corporation organized under the act could not construct a railway through the streets of a city without the consent of the municipal authorities, "and under such regulations and upon such terms and conditions as said authorities may from time to time prescribe." Hence, it is argued that any terms or conditions under which the railway company obtained the consent of the municipal authorities might by the same authorities be from time to time altered as they should in their discretion think fit.

In *Pingree vs. Michigan Central Railroad Company* (118 Mich. 314; also 76 N. W. Rep. 635), decided in 1898, the Supreme Court of Michigan held that section 15 of the laws of 1846, relating to the incorporation of the Michigan Central Railroad Company and other sections mentioned in the act, which provided that the company might fix, regulate and receive tolls taken for the transportation of passengers or property on the railroad subject only to the limitation, as to passengers, of 3 cents per mile, etc., the company having the power to charge for tolls and transportation such sums as might be lawfully established by the by-laws of the company and the board of directors having power to pass all by-laws necessary for carrying into execution all powers vested in the company, conferred a contract right on the corporation to fix tolls within the limits of 3 cents per mile, which right could not be violated by the acts of a succeeding Legislature.

There is no provision in the act referred to in the above cited case, of a nature similar to the one in question here, providing for regulations, terms and conditions which might from time to time be prescribed. The case shows, however, that in the opinion of the Supreme Court of Michigan, language similar to that used in the ordinance (omitting such provision), amounted to a contract, and the question remaining would be whether the further language contained in the ordinance permitted an alteration of the terms of the contract as the Common Council might from time to

time prescribe. The rate of fare is among the most material and important of the terms and conditions which might be imposed by the city in exchange for its consent to the laying of railroad tracks and the running of cars thereon through its streets. It would be a subject for grave consideration and conference between the parties, and when determined by mutual agreement the rate would naturally be regarded as fixed until another rate was adopted by a like agreement. Can it be possible that under this language permitting consent upon such terms and conditions as the city might from time to time prescribe the power was reserved to make a rate of fare which might ruin the whole enterprise? That a rate once deliberately and mutually agreed upon might be thereafter and from time to time altered at the pleasure of the city alone? Will it be believed the parties thus understood the meaning of that provision? It would hardly be credible that capitalists about to invest money in what was then a somewhat uncertain venture, while procuring the consent of the city to lay its rails and operate its road through the streets in language which as to the rate of fare amounted to a contract, and gave the company a right to charge a rate then deemed essential for the financial success of the enterprise, would at the same time consent that such rate then agreed upon should be subject to change from time to time by the sole decision of the Common Council. It would rather seem that the language above used did not and was not intended to give the right to the Common Council to change at its pleasure from time to time those important and fundamental rights affecting the very existence and financial success of the company in the operation of its road, but that by the use of such language there was simply reserved to the City Council the right from time to time to add to or alter those general regulations or rules for the proper, safe and efficient running of the cars, the character of service, the speed and number of cars and their hours of operation and matters of a like nature, such as are described in the opinion of the court below in this case. Such would seem to be a reasonable construction of the language. It is unnecessary to conclusively determine the question, because we think that under sections 20 and 29 of the Street-railway Act of 1867, above set out, and by the subsequent adoption of the ordinance of 1879 (set out in the foregoing statement of facts), relating to the Detroit City Railway Company (and by the adoption of similar ordinances thereafter with regard to the other companies), binding agreements were made and entered into between the city on the one side and the companies on the other relating to rates of fare, and such agreements could not be altered without the consent of both sides.

These agreements had express legislative authority, not only under the Tram-railway Act, but also and particularly under the Street-railway Act of 1867. By the twentieth section of the latter act it was provided that the rates of toll or fare, which any street railway may charge for the transportation of persons or passengers over its road, should be established by agreement between the company and the corporate authorities of the city or village where the road is located, and should not be increased without the consent of such authorities. The provisions of this section, among others, were by the twenty-ninth section of the act transferred to "all companies and corporations heretofore organized in this State for the purpose of building and operating street railways under the statutes then in force, and shall have the same powers, rights of protection and privileges and shall be subject to all the liabilities as hereby provided for companies organized under the provisions of this act."

It is plain that the Legislature regarded the fixing of the rate of fare over these street railways as a subject for agreement between the parties and not as an exercise of a governmental function of a legislative character by the city authorities under a delegated power from the Legislature. It was made matter of agreement by the expressed command of the Legislature. Ordinances of a like nature were passed by the Common Council relating to the other companies, and all of them were accepted in writing and they all had in them provisions relating to, or referred to ordinances providing for, the rate of fare in language similar to the foregoing.

Coming to a consideration of the effect of the language used, we think it amounted to a contract as to rates of fare. The ordinance of 1879 and the similar ordinances thereafter passed relating to the other corporations, together with the Street-railway Act of 1867, and sections 20 and 29 thereof, make out plain agreements entered into between the parties in relation, among other things, to the rates of fare to be charged by those companies. In the ordinance of 1879 and in the other ordinances under consideration, there were provisions made for special taxation of the companies which the Supreme Court of Michigan in *Detroit Citizens' Street Railway Company vs. Common Council of the City of Detroit* (125 Mich. 673), has held amounted to a contract between the parties which was as binding as though made by the Legislature

itself. Such decision by the Supreme Court of Michigan is entitled to very great respect and weight. If the ordinance constituted a contract between the parties in relation to taxes which were to be levied upon the company, we do not see any reason, in the language used providing for the rates of fare, for not holding that there is a contract as to those rates equally binding with that in regard to taxes.

In *City Railway Company vs. Citizens' Street Railroad Company* (166 U. S. 557), the Common Council of Indianapolis, on Jan. 18, 1864, adopted an ordinance which said: "Consent, permission and authority are hereby given, granted to and duly vested in the company organized with R. B. Catherwood as president, a body politic and corporate by the name of the Citizens' Street Railway of Indianapolis, and their successors, to lay a single or double track for passenger railway lines," etc., under which ordinance the railway was built. This court said (page 567): "The original ordinance of Jan. 18, 1864, was plainly a proposition on the part of the city to grant to the company the use of its streets for thirty years, in consideration that the company lay its tracks and operate a railway thereon upon certain conditions prescribed by the ordinance. This proposition, when accepted by the company and the road built and operated as specified, became a contract which the State was not at liberty to impair during its continuance; but if, at the expiration of the thirty years, the road had been sold to another company, and that company had applied for and obtained from the Common Council a franchise to occupy its streets for another period, it seems to be clear that such a contract would need no other consideration to support it than the continued operation of the road under such conditions as the city chose to impose."

Although in that case there was no provision in the statute directing that the rates of fare should be established by agreement, yet, nevertheless, it was held that the language used amounted to an agreement upon the subject matter which could not be altered during its continuance by either party.

Upon this question considerable stress has been laid in the brief and in the arguments of counsel for the defendants upon the case of *Georgia Railroad & Banking Company vs. Smith* (128 U. S. 174). The twelfth section of the charter to that company declared, among other things, that it should have the exclusive right of transportation or conveyance of persons, merchandise, etc., over the railroad to be constructed, and it provided that the charge of transportation or conveyance should not exceed 50 cents per one hundred pounds for heavy articles, and 10 cents per cubic foot on articles of measurement for every one hundred miles, and 5 cents per mile for every passenger. Permission was granted the company to rent or farm out any part of their exclusive right of transportation to any individual on such terms as might be agreed upon. Pursuant to that authority the company leased to one Wadley for the term of ninety-nine years such privileges. Afterward the Legislature of Georgia created a board of railroad commissioners (Laws of Ga. 1879, p. 125), and gave the board power to prevent railroad companies from charging other than just and reasonable rates. That board prescribed rates for the transportation of freight and passengers by railroad companies in the State which were less than the maximum rates authorized by the twelfth section of the charter of the company above referred to. The question of the validity of this order of the board of commissioners was brought before this court, and it was held that the language of the charter did not justify the holding that, notwithstanding any altered conditions of the country in the future, the Legislature had, in 1833, at the time of the grant of the charter, contracted that the company might for all time charge rates for the transportation of persons or property over its line up to the limits there designated. The reasons for so holding are stated by Mr. Justice Field at pages 180 and 181 of the report, and it was not thought that in the exercise of the merely governmental function of creating a charter and incorporating the banking and railway company the Legislature had in regard to this particular matter of rates surrendered the right to alter the maximum charges. The language used was regarded as a mere delegation of authority by the Legislature to the company to make those charges until the authority was altered or withdrawn. In other words, that the language did not constitute a contract or agreement between the parties, the Legislature and the railroad company.

In the case at bar, however, the rates are fixed under the provisions of a statute which declares that they shall be so fixed by agreement between the parties. The ordinance of 1879 adopts that of 1862 and reaffirms it. The rate of fare therein provided is made a rate under the ordinance of 1879, and that ordinance was adopted while the Street-railway Act was in force, and which specially provided for an agreement as to rates of fare, and the provisions of that act were transferred to the companies organized

under the Tram-railway Act. It may very well be that language used by a Legislature in merely conferring authority upon a company to fix certain charges for fare might not be regarded as amounting to a contract, when the same language used by parties in fixing rates under a legislative authority and direction to agree upon them would be regarded as forming a contract because the statute provided specially for that mode of determining them. Under such direction, we are of opinion the language used in the ordinances amounts to an agreement, for that is the way in which the rates are to be arrived at, and the reaffirmation of the previous language, by reaffirming and adopting the ordinance of 1862, by the ordinance of 1879, and its acceptance, constitute an agreement as of that time. The same as to the ordinances relative to the other roads. The rate of fare having been fixed by positive agreement under the expressed legislative authority, the subject is not open to alteration thereafter by the Common Council alone, under the right to prescribe from time to time the rules and regulations for the running and operation of the road.

Nor does the language of the ordinance, which provides that the rate of fare for one passenger shall not be more than 5 cents, give any right to the city to reduce it below the rate of 5 cents established by the company. It is a contract which gives the company the right to charge a rate of fare up to the sum of 5 cents for a single passenger, and leaves no power with the city to reduce it without the consent of the company. The language of section 20 in the Street-railway Act of 1867, which provides that the rate of fare agreed upon shall not be increased without the consent of the city authorities, does not mean that the rate may be reduced without the consent of the railway companies, nor does it show the parties did not suppose there was a contract between them as to rates. That provision does not seem to perform any material function, because without it, the parties having agreed upon the subject of rates, it would follow that the agreement could not be altered by either party without the consent of the other. It may be that it was meant that the company, while unable to increase the rates of fare without the consent of the city authorities, had the right to reduce the rates as it might please without consulting the city.

It was probably inserted from abundant caution, but in no event can it properly or fairly be regarded as an implied permission to the city authorities to reduce the rates of fare as agreed upon without the consent of the railway company. The reasons are obvious and need not be restated.

It is said, however, that section 34 of the Tram-railway Act was amended some twenty-two days after the passage of the Street-railway Act containing the above sections 20 and 29, and that, therefore, the provisions of the amended Tram-railway Act must apply exclusively.

The amendment made to section 34 of the latter act in 1867 has been set forth in the statement of facts above made, but for convenience will be repeated here, as follows:

Provided further, that after such consent shall have been given and accepted by the company or corporation to which the same is granted, such authorities shall make no regulations or conditions whereby the rights or franchises granted shall be destroyed or unreasonably impaired, or such company or corporation be deprived of the right of constructing, maintaining and operating such railway in the streets in such consent and grant named pursuant to the terms thereof.

Referring to this amendment, it is argued that the city had the right to pass these ordinances of 1899 as a regulation and condition for the operation of the road, unless the rights or franchises already granted to the company should thereby be destroyed or unreasonably impaired, or unless the company would be thereby deprived of the right of constructing, maintaining and operating its railway pursuant to the terms of the original consent, and such impairment is not alleged in the complainant's bill. It is obvious that the additions to the original Tram-railway Act made in 1861 and 1867 were laws in *pari materia* with the Street-railway Act passed in 1867, and should therefore be construed together to obtain the legislative meaning.

Bearing in mind the provision of section 29 of the Street-railway Act, granting to other corporations the same powers as are given to the companies organized under that act, and coming to a consideration of the amendment to section 34 of the Tram-railway Act made in 1867, we find no inconsistency or contradiction between the two acts. The amendment to the thirty-fourth section prohibited the city from making any regulations or conditions whereby the rights or franchises of the company should be destroyed or unreasonably impaired, or whereby it should be deprived of the right of constructing, maintaining and operating its railway pursuant to the terms of the consent, while section 20 of the Street-railway Act provided in terms for an agreement between the parties upon the question of rates of fare, and the parties having fixed such rate by agreement, entered into by authority

of the Legislature, there can be no question of its binding force. Section 14 of the same act also safeguarded the rights of the companies, and that section might be referred to in aid of its rights by the company. The Tram-railway Act amendment of 1867 is a general provision regarding regulations or conditions, destroying or unreasonably impairing rights or franchises already granted, or depriving the company of rights of construction and operation, and should be construed also in connection with section 14 of the Street-railway Act, while the matter of rates of fare is specially provided for by section 20 of the last-named act, which provides for an agreement on that subject. The two acts are entirely harmonious and may be fully carried out so as to involve neither incongruity nor inconsistency.

But the defendants raise the objection that section 29 of the Street-railway Act cannot be applied to companies formed under any other act for the reason that to apply it to such companies would violate the State constitution, section 20 of article 4, which provides that "no law shall embrace more than one object which shall be expressed in its title."

The title of the Street-railway Act is "An act to provide for the formation of street railways," and the claim is made that the provision of section 29, making the act applicable to other companies, is outside and beyond the object of the act as expressed in its title.

The meaning to be given to the constitutional provision was stated in *People ex rel. Secretary of State vs. State Insurance Company* (19 Mich. 392), wherein Chief Justice Cooley, at page 398, said:

We must give the constitutional provision a reasonable construction and effect. The Constitution requires no law to embrace more than one object, which shall be expressed in its title. Now, the object may be very comprehensive and still be without objection, and the one before us is of that character. But it is by no means essential that every end and means necessary or convenient for the accomplishment of the general object should be either referred to or necessarily indicated by the title. All that can reasonably be required is that the title shall not be made to cover legislation incongruous in itself, and which by no fair intendment can be considered as having a necessary or proper connection.

Similar provisions are to be found in the constitutions of several of the States, among them that of New Jersey, and the meaning of such provision was brought before this court in *Montclair vs. Ramsdell* (107 U. S. 147), and it was held that the provision did not require a detailed statement or index or abstract of its contents in the title of an act, and that it did not prevent uniting, in the same act, numerous provisions for one general object fairly indicated by its title.

The constitution of Illinois contains a similar provision, the construction of which also came before this court in *Jonesboro City vs. Cairo, &c., Railway Company* (110 U. S. 192, 198). In that case this court said, through Mr. Justice Harlan:

The title of the act is "An act to amend the charter of the Cairo & St. Louis Railroad Company." The contention is, that the legalization of an election previously held, and at which the people voted in favor of a subscription of stock to that company, and the granting of authority to issue bonds in payment of such subscription, is not a subject expressed by the title of the act. In this view we do not concur, and our conclusion is justified by the later decisions of the Supreme Court of Illinois construing a similar provision in the State Constitution of 1870. It was held in *Johnson vs. People* (83 Ill., 431,) that the Constitution does not require that the subject of the bill must be specifically and exactly expressed in the title; hence we conclude that any expression in the title which calls attention to the subject of the bill, although in general terms, is all that is required.

We have examined the various cases cited by counsel for the defendants, arising in the State of Michigan under the constitutional provision in question, and it is sufficient to say that we think not one of them extends that provision so as to embrace a case like the one at bar. Narrowly considered, an act to provide for the formation of street railway companies should contain nothing but provisions relating to their formation and organization, but it would be absurd to hold that the constitutional provision would prevent the introduction into such an act of various details in regard to the corporations after their formation and in regard to their government, operation, regulation and other matters which might be fairly considered as germane to the particular object named in the title of the statute, and hence, we think it would be a most narrow construction of the constitutional provision to hold that under such a title it was incompetent for the Legislature to provide that the benefits and obligations conferred and provided for in the act should be made applicable to corporations of a like character already organized and in operation. It is germane and appropriate to the subject matter of the act, and to enact under such a title that all companies of the like nature should have the same privileges is fairly within the general object described in the title. This being true, the companies organized under the Tram-railway Act were equally, with those organized under the Street-railway Act, enabled by the express authority

of the Legislature to enter into a contract for a rate of fare with the city, and when in 1879 and the subsequent years those companies which were organized under the Tram-railway Act entered into further agreements with the city in the way of ordinances, those agreements were valid so far as the objections heretofore considered are concerned, and not subject, in regard to this matter, to alteration at the will of one party only. The agreements being valid in the case of companies organized under the Tram-railway Act, it follows that those entered into with the other companies organized under the Street-railway Act were also valid.

Still another objection is raised by the defendants to the validity of the ordinances passed in 1879 and 1880 and 1885, by which the powers and privileges conferred and the obligations imposed upon the railway companies by the former ordinances were extended and limited to thirty years from date of the supplemental ordinances, the objection being that the extending of the term of the consents beyond the then limit of the corporate life of the companies was illegal and void. We are not of that opinion.

This was matter of agreement between the parties. The franchise to be a corporation came from the State, and all that the company required from the city was its consent to the laying down of the rails and the operation of the road through the streets of the city, and such consent was to be given upon terms and conditions to be agreed on. This consent, when given, became a privilege or franchise granted to the corporation, and was property belonging to it. By the ordinance of 1879 the duties and obligations of the company therein mentioned were largely increased, additional taxes were provided for, and also extensions of its tracks as stated in the ordinance. The company also agreed to furnish all the materials and do all the paving mentioned at its own expense. One inducement to the company to agree upon and accept this ordinance was that the term which the city had originally consented to for the use of its streets by the company should be extended to thirty years from the date of the new ordinance. Although the company itself, by the act under which it was incorporated, was limited in its corporate life to a term of thirty years from the date of its organization in 1862, the extension of the term of consent by the city carried such consent about sixteen years beyond its then corporate life. Of course, no one contends that this extension of the term for the use of the streets of the city in any manner affected the limit of the term of the corporate life of the company, but the limitation of its life did not prevent it from taking franchises or other property, the title to which would not expire with the corporation itself. A corporation whose corporate existence was limited to a term of years could always purchase the fee in property which it needed for the operation of its business. If at the end of its term its life were not extended, the property which it owned was an asset payable to the shareholders after the payment of its debts, and in a case like the present, where the consent was assignable and transferable, particularly by virtue of section 15 of the Street-railway Act above set forth, any company itself having corporate existence for that purpose could purchase the outstanding term and operate its road thereunder. We see no reason why the company could not take the extended term as provided for in the ordinance, and it formed a good consideration for the agreement on the part of the company to perform the other obligations contained in the ordinance. This exact proposition has been determined by the Circuit Court of Appeals for the Sixth Circuit in *Detroit Citizens' Street Railway Company & others vs. City of Detroit* (12 C. C. A. 365; same case, 64 Fed. Rep. 628). In the course of the opinion of the court in that case, the cases of *People vs. O'Brien* (111 N. Y.) and *Minor vs. Central Railroad Company* (123 N. Y. 242) were cited. *People vs. O'Brien* is one of the leading cases in New York upon that subject, and it was there held that a corporation, although created for a limited period, might acquire title in fee to property necessary for its use, and where the grant to a corporation of the franchise to construct and operate its road in the streets of a city is not, by its terms, limited and revocable, the grant is in fee, vesting the grantee with an interest in the street in perpetuity to the extent necessary for a street railroad; the rights granted to be exercised by the corporation or whomsoever may lawfully succeed to such rights. In that case the authorities show that a franchise of the above nature is invested with the character of property and is transferable as such, independently of the life of the original corporation. The other case, in 123 N. Y., announces the same doctrine. It is not a new one, and the decisions have all been one way, in favor of the right of a corporation, limited as to the time of its corporate existence, to purchase or acquire by agreement or condemnation property for its use, the title to which it might own in fee.

The case above cited in the Circuit Court of Appeals for the Sixth Circuit, it will be noticed, is between the same parties as the case at bar, and if the judgment therein had been pleaded or

put in evidence upon the trial of this action, we cannot now see why it would not have been *res adjudicata* between the parties in this suit upon that question, at least as to the particular road then under discussion.

In *City of Detroit vs. Ellis, Attorney-General* (103 Mich. 612), upon an application for a mandamus the decision of the United States Circuit Court of Appeals was regarded as *res adjudicata* of the question in issue in that suit on an application by the city and certain individual citizens for a mandamus to compel the Attorney-General to file an information in the nature of quo warranto to inquire by what right the railway company maintained and used its tracks in the streets after the date named. Without treating the case in the Circuit Court of Appeals as strictly *res adjudicata*, we regard the conclusion arrived at by that court upon the question under discussion as correct, and consequently the objection now urged by the defendants to the validity of the ordinance of 1879 and the other ordinances similar to it cannot be maintained.

The further objection is made that under the power of alteration and repeal, provided for in the constitution of Michigan and under the terms of the various ordinances giving power to the Common Council in certain cases to provide for further rules and regulations, the right is reserved to the Common Council to alter the rates of fare provided for in the various ordinances under consideration, as it alone may regard reasonable and just, without the consent of the company.

The constitution of the State of Michigan, article 15, section 1, provides: "Corporations may be formed under general laws, but shall not be created by special act except for municipal purposes. All laws passed pursuant to this section may be amended, altered or repealed." Counsel for the defendants contends "that the regulation of rates of fare or toll upon the street railway is a governmental function, delegated by the Legislature of the State of Michigan to the municipalities, and no matter in what form such delegation of power may be exercised, whether by ordinance or an assumed contract, it is nevertheless a law, subject to alteration, amendment or repeal. It has not been the policy of the State of Michigan since the adoption of the present constitution to permit irrevocable legislation. The State cannot do it itself, and if it cannot, surely one of its creatures, like a city, cannot be permitted to do that which its creator is prohibited from doing."

We have already seen that the Legislature was competent to grant to the city of Detroit the right to give its consent to the laying of the tracks of a street railway and the operation of the same in and through its streets upon such terms and conditions as the parties might agree upon. The grant of this power was not the formation of a municipal corporation, directly or indirectly, either in substance or effect. The legislative act which granted the power to the city could not be altered, amended or repealed by the latter. No such power was given to it by the Legislature and probably could not even be delegated in any event. It is sufficient to say that none was attempted. (*City Railway Company vs. Citizens' Railway Company*, 166 U. S. 557, 563.)

The Legislature has not attempted to interfere with the rights of the street railway companies in Detroit, and hence the extent of its power so to do is not involved in this case.

We are then brought to the question of the reservations in the ordinances themselves. An examination of them leads us to the conclusion that not one provided or was intended to provide for a power to alter an agreement in relation to the rates of fare entered into between the parties. The right from time to time to make such further rules, orders or regulations as to the Common Council may seem proper cannot be held to extend to the alteration of a contract as to the rate of fare which shall be charged for the transportation of passengers. We think, as was stated by the court below, that this reservation permitted the city to make further rules or regulations than those contained in the ordinances, in regard "to all matters incident to the construction and operation of the road, such as the location of the tracks in the streets, the placing of switches and turntables, the repair of the pavement between the tracks, the removal or limitation of the number of tracks, in the interest of public travel, the frequency with which cars should be run for the public convenience, the stopping of cars at street crossings, the use of fenders, the rate of speed to be maintained, the sale of tickets, and generally to details of the conduct and operation of the railway, which experience might show to be necessary, in addition to or in amendment of those specified in the consent, for the protection of life, the accommodation of the public, and the avoidance of injury to private property. Such regulations are not invasions of the contract rights of the company and are just and reasonable." (*Lake Shore & Michigan Southern Railway Company vs. Ohio*, 173 U. S. 285, 305).

The fixing of rates is, as we have already said, among the most

vital portions of the agreement between the parties contained in the ordinances. It cannot be supposed for one moment, with regard to a right so fundamental in its nature, that there was any intention to permit the Common Council in its discretion to thereafter make an alteration which might be fatal to the pecuniary success of the company. For the reasons already given, we think the language used does not, in fact, give any such power to the Common Council. The ordinances of 1899 are, so far as this record shows, the first wherein the Common Council has assumed to make any change in the rates of fare without the assent of the company to be affected thereby. From 1862 until 1899 there seems to have been no attempt to exercise this alleged power of alteration by the Common Council without the consent of the railway company. While the rate of fare existed as agreed upon between the city and the railway company, expenditures involving millions of dollars were entered upon, changing the mode of transportation from animal to electric power, and no claim seems ever to have been made on the part of the city of a right of alteration to be exercised in accordance only with its own views of reason and propriety. This in itself is a strong implication of the want of any such power under the various reservations set forth in the foregoing statement of facts and contained in the ordinances specified. But aside from that, and considering only the nature of the right itself growing out of the agreement as to fares, we are of the opinion that not one of the reservations of the right to make further rules or regulations could by any fair construction be held to include the right on the part of the city at its own pleasure to reduce the rates of fare agreed upon in those ordinances.

We have thus answered the chief objections of the city to the maintenance of this action. Some others have been made, which we have examined, but do not think it necessary to further refer to them than to say they are in our opinion not well founded.

We think the conclusions arrived at by the court below are correct, and its judgment is, therefore, *Affirmed.*

The Everett-Moore Situation

The transfer of the control of the Cleveland Electric Railway Company to the syndicate headed by Horace Andrews was effected March 8. Mr. Andrews handed to Chairman Newcomb, of the bankers' committee, a check for \$3,545,000, and received certificate for 43,000 shares of the stock of the Cleveland Electric Railway, and 1000 shares of the stock of the Cleveland City Railway. Immediately after the transfer a meeting of the Cleveland Electric Railway Company was held. The last official act of H. A. Everett was to nominate Mr. Andrews for the presidency of the company. Mr. Andrews was elected president, Henry J. Davis, secretary of the National Carbon Company, secretary, vice Fred S. Borton. Vice-President Harmon and Treasurer George S. Russell continue. The deal gives the Andrews syndicate 65,000 shares. The Pack interests in the company have 20,000 shares, and the Harmon interests have about the same. It is understood that the Everett-Moore syndicate still holds quite a block of Cleveland City stock.

Both Mr. Andrews and Mark Hanna deny that steps have been taken for the immediate consolidation of the companies, but it is so much a matter of common talk that there can be no doubt the deal is about to be concluded. The project is in the hands of the "Cleveland Electric Syndicate," formed to purchase the Everett-Moore holdings. The syndicate agreement gave Mr. Andrews until March 1, 1903, to complete his plans, Mr. Andrews to have unlimited discretion as to the steps to be taken to bring about the consolidation. In case of his withdrawal, his successor is to be selected by Senator Hanna, John J. Stanley, Myron T. Herrick, J. H. Wade and Samuel Mather, all of whom are members of the syndicate. It has been reported that the consolidation will be effected on a basis of \$80 for Cleveland Electric stock and \$120 for Cleveland City stock, but this basis is believed to be incorrect. It is more probable that it will be on a basis of the earnings for the past year and the appraised valuation of the property. The combined capitalization of the two companies is \$21,600,000.

It is known that a representative of the "Cleveland Electric Syndicate" has had several conferences with the city administration relative to fares, franchises and 3-cent fare competition, but the results of the conferences have not been made public. It is reported that the syndicate offered to give 4-cent fare in return for a blanket franchise for existing lines and fifty miles of new roads. This cannot be verified.

It is believed that some of the immediate results of the consolidation will be universal transfers, a change of the routes of a number of lines, and the entire rearrangement of the power distribution system.

The \$3,500,000 received by the bankers' committee for the Everett-Moore holdings in the Cleveland Electric Railway and the Cleveland City Railway will materially relieve the syndicate of its financial embarrassment. Most of the money will go to the banks which have loaned money on Cleveland Electric Railway stock, and the balance will be placed in an escrow fund for the settlement of other indebtedness. The matter of selling to Toledo Railways & Light Company is still unsettled, and the proposed purchasers have been granted a ten-days' extension on their option. The sale of this property would place the syndicate in very good shape, as the option price is \$30. It is understood that the Everett-Moore syndicate paid \$12 for the stock when it was purchased last year.

It is believed that the Northern Ohio Traction Company will not be sold. The proposed customer for this property failed to materialize, and as the committee has done so well with other properties it is not anxious to sell the property. The election of officers for the Northern Ohio Traction Company was held Friday, March 7, and resulted as follows: Henry Everett, president; Will Christy, first vice-president; Charles Currie, second vice-president and general manager; C. F. Moore, secretary; J. R. Nutt, treasurer.

There is now every indication that the bankers' committee will sell the Detroit & Toledo Shore line to some steam road. It is generally admitted that this property would make a better steam proposition than an electric, since it traverses a territory which needs freight connection. Messrs. Everett and Moore were in conference last week with Messrs. Black and Muckley, who now own the Toledo & Monroe Railway, and it is generally believed that this road will be extended to Detroit over the right of way already owned, and that it will be operated in connection with the Everett-Moore line from Cleveland to Toledo.

Power Transmission in Mexico

The Rossiter-MacGovern Company of 141 Broadway, New York City, who has successfully financed and built several electric power plants in Mexico, has recently secured a large concession in Toluca, that country, covering two separate water-powers, aggregating over 8000 hp. Construction was begun on the smaller plant and the work inaugurated with considerable ceremony by Governor Vincente Villada and other leading officials of the State of Mexico in person on Jan. 2, this year. The plant will have a nominal capacity of 1200 hp. and contracts have already been made for the furnishing of power and light equal to two-thirds of this. The plant was designed by Alex. Potter, electrical engineer, of 150 Nassau Street, who is in direct charge of construction. The plans have been approved by W. A. Brackenridge, of the Niagara Power Company.

Contracts have been let for all the machinery required, and it is expected to have the plant in operation in July next. The Pelton Waterwheel Company is to furnish three 450-hp turbine wheels, together with the steel flume, receiver, etc. The Stanley Electric Manufacturing Company has the contract for three 325-kw generators and transforming apparatus and switchboard in the station, the General Electric Company will furnish all sub-station apparatus, rotary converters, transformers, switchboard, together with some 300 of their newest type 1200-cp arc lamps. The Western Electric Company is furnishing some 200 miles of copper wire, and all line material, insulators, etc., together with a complete telephone outfit.

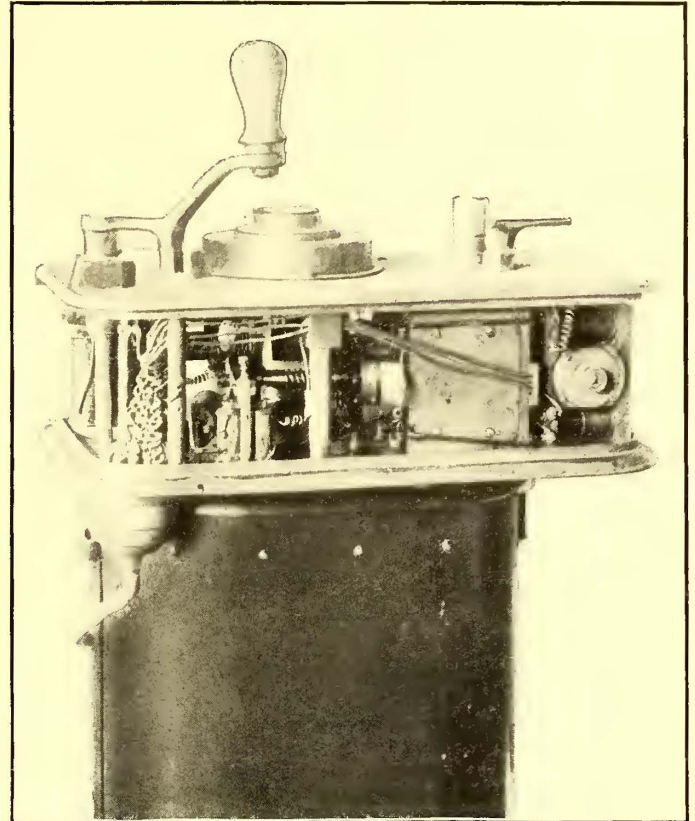
The transmission lines will carry 22,000 volts, at which voltage the power will be transmitted to Toluca, which is about 22 miles from the station. Power and light will also be furnished to the municipalities of Tenancingo and Tenango, catering altogether to a population of over 100,000. The water of the stream for which power is depended on has its origin in the rain and snow from Toluca Mountain, and is practically constant during the year. Measurements and gaging, which have been in progress since 1895, show a flow of 650 liters or 23 cu. ft. per second, and a fall of 720 ft. in 6000 ft.

The necessary capital required has been furnished by a syndicate, and upon completion of the plant it will be turned over to the Toluca Electric Light & Power Company, a corporation to be formed under the laws of the State of New York. The principal owners include Senator Chauncey M. Depew, W. W. Goodrich, H. C. M. Ingraham, E. V. W. Rossiter, D. H. Valentine, J. L. Greatsinger, T. S. Williams, C. L. Rossiter, H. C. Du Val, John R. Christie, many of whom are well known in American electrical and traction work.

The work is one of the most important which has been undertaken in North America, and its development will be watched with interest.

A New Automatic Controller

The desirability of an apparatus whereby the current supply to the motors of an electric car may be controlled by some automatic means is indicated by the number of devices both simple and complex which have been placed upon the market to meet this requirement. Allowing motormen to have full control of the amount of current which is passing through the motors necessitates a great amount of training and a full realization on their part of the conditions under which the motors operate in order that a great waste of current may not occur or that the apparatus may not be seriously damaged by unnecessary loading. The device shown in the accompanying engravings is a new form of automatic controller, which is intended to be used in connection with the ordinary series-parallel controller, and which converts the ordinary apparatus into one which is entirely automatic. It is shown in the half-tone illustrations attached to a K-9 controller



FRONT VIEW OF MASTER CONTROLLER

with the casing removed so as to show the mechanism of the automatic device on top from both front and rear.

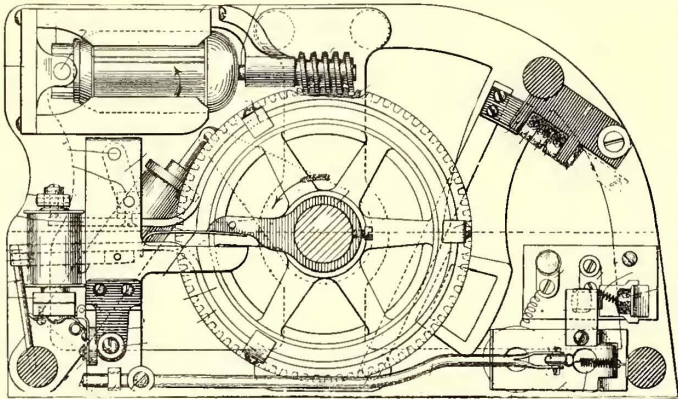
The other engraving shows a plan view giving the principal details of the device. In the upper left-hand corner will be seen the motor, having on its shaft an endless screw, which engages the teeth on a gear wheel on the main shaft of the controller. By an ingenious system of cams and stops the turning on of the handle of the automatic apparatus makes contact at the carbon blocks in the upper right-hand corner, which completes the circuit of the motor and starts the gearing, thereby operating the drum of the main controller. Two speeds are obtainable, one having the motors in series position with all resistance cut out, and the other having the motors in parallel position with all resistance cut out, and these two conditions are the only ones that can be obtained when the apparatus is installed. If the motorman turns the handle half-way on, the cams on the driving mechanism open the circuit of the auxiliary motor at the predetermined point where the car motors are in series, and until the handle is moved forward, again starting the auxiliary motor and therefore the drum of the main controller, the car motors will remain in series. The connection between the driving apparatus and the controller drum is effected by a differential gearing so as to give a positive, slow-speed rotation to the latter. This consists of an ingenious combination of gears and pinions so arranged that only by applying an electrically operated frictional device to one of the gear wheels can the system be put in motion. If the pressure is released on this brake the controller drum is carried back to the off position, and the operating motor of the automatic attachment can run on indefinitely without being able to bring it back. All jar

to the main controller, however, is eliminated by the fact that a dashpot is attached to an arm on the shaft of the driving mechanism. Should the trolley pole come off therefore the brake on the gear is released and the controller drums fly round. If the power supply be interrupted at the station or along the line the controllers on all the cars will immediately return to the off position independently of the position of the motorman's handle, and when the supply of current is again obtained the controllers

the car, which will operate the main controller at the other end as well as if placed directly over it.

In reversing the car motors a separate auxiliary motor is placed in the automatic apparatus which operates the mechanism of the controller. When used as a multiple-unit system four wires only are required for the train line, two for the reversing motors and two for the motors which drive the controller drum. These auxiliary motors operate at the full line potential of 500 volts or over, taking but three-tenths of an ampere when running.

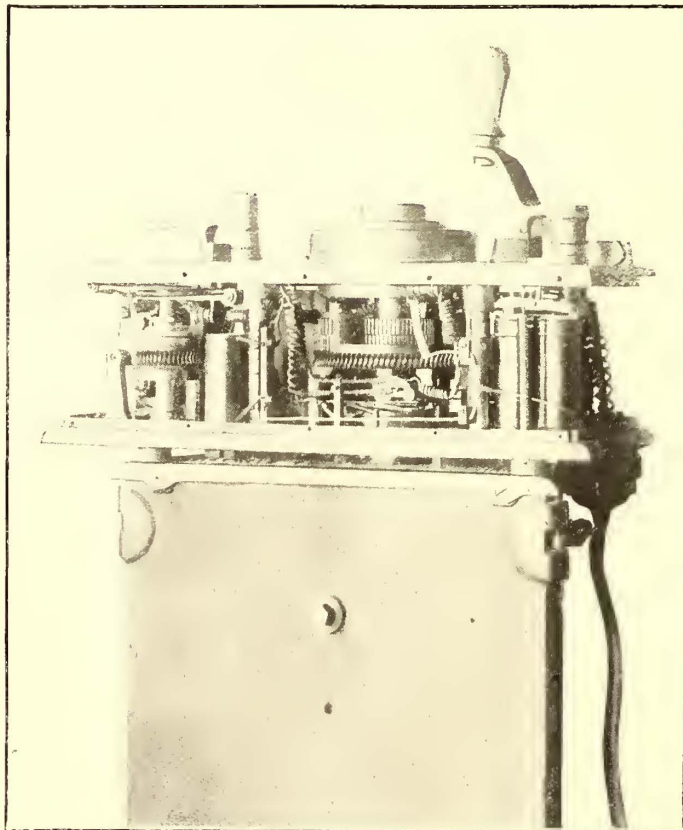
Although the device is so arranged that it is impossible for the motorman to run steadily at any speed other than that provided by the motors, either in series or in parallel, without resistance in circuit, any variation of speed necessary can be obtained by the process of drifting—that is, starting up the auxiliary motor by throwing the handle on to the full speed position and then allowing it to return to the off position. No matter how this is done, the operator, having no personal control over the rate of acceleration, cannot jerk the car, a feature of the device which is also very noticeable in starting from a standstill. The apparatus has been so designed that it is entirely distinct from the controller proper, and should it in any way get out of order it can be immediately removed from the top of the controller box and the ordinary handle substituted. In case the motorman should become incapacitated, or for any reason release his hold on the handle, it immediately flies back to the off position, cutting off the current from the car. This fact is also an advantage in case of accident when the motorman can leave his current to take care of itself and devote the strength of both hands to the application of his brake. Several interesting tests have been made with the device, showing the relation between the average speed attained and the power consumed, all of which have proved exceedingly satisfactory to those interested in the apparatus. The patents under which it is manufactured were obtained by E. R. Gill, and are owned and controlled by the Invention Development Company, of New York, of which Nelson Hiss is vice-president and general manager.



TOP PLAN VIEW OF MECHANISM

will all be put on at the predetermined speed for which the auxiliary motor is adjusted.

Another important feature of the device is its adaptability to the operation of the cars in a train, forming a complete multiple unit system of control. It is evident that if a number of cars having auxiliary motors for driving the controller drum be connected in a train, and the auxiliary motors of all the controllers



REAR VIEW OF MASTER CONTROLLER

be connected together by a simple system of wiring, the operation of the handle of the first controller will start all of the auxiliary motors of the train and immediately turn on the current to all the car equipments at a predetermined rate of speed, starting the train at an economical rate of acceleration. All that has been said in regard to running at different speeds and throwing off the controllers in case of interruption of current will of course apply as well to the operation of the device in multiple as when used singly. Another advantage is the fact that only one main controller is necessary for a double-ended car, as a second controlling device or master controller can be placed at one end of

The Norfolk Strike

The striking employees of the Norfolk Railway & Light Company and the officers of the company had failed to come to terms for a settlement of the strike up to Tuesday. The strikers refused to accept the terms of arbitration named by the arbitrators, though both strikers and company agreed to accept the arbitration decision. The main objection of the strikers is that they are required to work with non-union men; that only 85 per cent of them will be re-employed, and that they must sign the surety company bond.

The cars are being operated regularly, but under a strong military guard, which has recently been doubled. The rioting is done principally at night, and many citizens and soldiers have been injured. It has been found necessary to have the soldiers discharge their rifles over the heads of the crowds in order to quell especially violent outbreaks of lawlessness.

Street Railway Patents

[This department is conducted by W. A. Rosenbaum, patent attorney, Room No. 1203-7 Nassau-Beckman Building, New York.]

UNITED STATES PATENTS ISSUED MARCH 4, 1902

694,385. Bolster for Railway Cars; F. S. Ingoldsby and J. R. Bowling, St. Louis, Mo. App. filed July 13, 1901. The bolster consists of a central frame, a channel-shaped compression member extending across the frame, a tension member extending across the frame, the ends of the tension member and compression member being secured together, and a center bearing within the channel member where it crosses the frame.

694,425. Electric Railway System; J. Ryan, Watertown, N. Y. App. filed Oct. 8, 1900. The switchbox contains a solenoid whose core carries a mercury cup which is raised by magnetism and lowered by gravity to make and break a circuit between two terminals, which are thereby thrust into and out of the mercury.

694,461. Side Bearing for Railway Cars; F. R. Cornwall, St. Louis, Mo. App. filed Nov. 19, 1901. The balls or rollers are restored to a neutral position after a side movement of the car, by a spring which is put under compression by the said side movement.

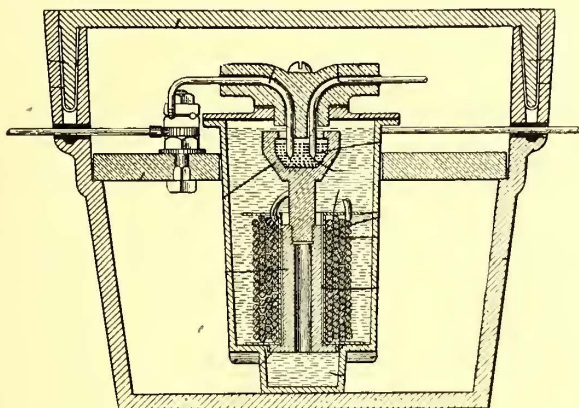
694,473. Car Truck; J. F. Hobbs, Bridgeport, Conn. App. filed Sept. 13, 1901. The lubricating material is conveyed to the journals by rollers running in reservoirs of oil.

694,503. Roller Side Bearing; J. C. Wands, St. Louis, Mo. App. filed June 21, 1901. A modification of No. 694,461.

694,504. Side Bearing for Railway Cars; J. C. Wands, St. Louis Mo. App. filed Aug. 31, 1901. A modification of No. 694,461.

694,505. Roller Side Bearing; J. C. Wands, St. Louis, Mo. App. filed Oct. 16, 1901. The rollers forming the bearing are themselves mounted in ball bearings.

694,506. Side Bearing; J. C. Wands, St. Louis, Mo. App. filed Nov. 8, 1901. The top bearing contacts with the lower bearing at one side of its axis of rotation, whereby the wear on the bearing plate is reduced to a minimum.



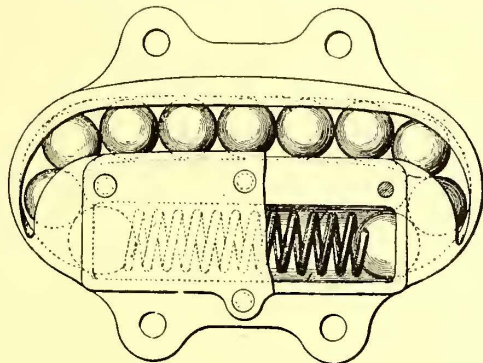
PATENT NO. 694,425

694,549. Roller Side Bearing; C. F. Huntoon; Chicago, Ill. App. filed Oct. 4, 1901. The rollers are mounted in a closed box and project through slots in the cover to engage with the moving surface.

694,582. Plug or Bush for Connecting Wires or Bars to Pieces of Metal; E. A. Richardson, Charenton, France. App. filed July 20, 1901. A rail-bond in which the end of the wire is held in a conical split plug.

694,741. Automatic Switch-Operating Device; G. G. Guenther, Los Angeles, Cal. App. filed Nov. 12, 1900. An inclined arm on the car passes under the free end of a pivoted lever, and during the progress of the car the lever is gradually lifted to throw the switch.

694,742. Railroad Switch; G. G. Guenther, Los Angeles, Cal. App. filed Nov. 28, 1900. In a power-operated switch means are provided for disconnecting the operating lever and the switch bar, when an obstruction opposes the movement of the switch rail.



PATENT NO. 694,506

694,787. Radial Car Truck; W. Robinson, Brooklyn, N. Y. App. filed Oct. 21, 1901. The wheel frame is connected with the main truck frame by swing links, which are pivotally connected to the main frame and support the wheel frame therefrom.

694,851. Portable Tramway; J. H. Gardner, New Orleans, La. App. filed Oct. 28, 1901. A portable tramway for pile-drivers and other construction apparatus in which the track is in sections and adapted to be lifted from the rear and transferred to the front of the pile-driver, where it is deposited upon the new work and permits the machine to be moved ahead.

694,883. Sar Fender; J. J. McGarity and G. R. Hopf, Pittsburgh, Pa. App. filed July 17, 1901. Details of construction.

ENGINEERING SOCIETIES

THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS.—The Institute will hold its annual convention this year among the Berkshire Hills, the dates which have been selected being June 17, 18, 19 and 20. Hotel accommodations have been

secured and a special train will leave New York on June 16 to carry such members of the Institute as reside in that city and vicinity. Although the subjects of the papers to be read and discussed at this meeting have not yet been made public, the interest of street railway men in the proceedings last year will be well remembered, and it is expected that the committee on papers this year will continue the policy of making this department of the electrical engineering profession an important feature.

CANADIAN ELECTRICAL ASSOCIATION.—The annual convention of the association will be held at Quebec on the 11th, 12th and 13th of June. Every effort is being made by the officers of the association to make this the most successful meeting held by the society, and it will undoubtedly be attended by a large number of engineers from the "States" as well as from Canada. The great amount of electrical engineering work which is now progressing in the vicinity of Quebec makes the location of that city one of the most advantageous at the present in Canada for providing interesting excursions to the visiting members, and it is expected that the papers to be read will be of a high grade and presented by engineers of reputation and ability.

PERSONAL MENTION

MR. L. J. MAYER, formerly superintendent of the Lima Electric Railway, of Lima, Ohio, has resigned that position, and accepted a position with the Buffalo General Electric Company.

MR. ROBERT P. LEE has resigned as superintendent of the Woronoco Street Railway Company, of Woronoco, Mass. Mr. Lee has not yet determined on plans for the future. James H. Bryan, president of the company, will act as superintendent temporarily.

MR. R. H. SCOTTER, of London, has been selected to read an additional paper before the convention of the International Street Railway Association, to be held July 1 to 4, 1902, in London. The title of the paper is "Tramway Legislation in Different European Countries."

MR. F. NONNENBERG, secretary and treasurer of the International Street Railway Association of Brussels, has resigned the former office, owing to the press of other duties. Mr. t'Serstevens has been appointed secretary of the association in the place of Mr. Nonnenberg.

MR. HENRY FLOY, consulting engineer of New York, recovered from a serious attack of typhoid fever. He has just returned from a two-months' trip to Italy and France, which he took for the benefit of his health, which, his friends will be glad to hear, is now fully restored.

MR. MAURICE COSTER, manager of the sales department of the French Westinghouse Company, at Paris, and formerly manager of the Chicago office of the Westinghouse Electric Manufacturing Company, was married on Feb. 19 at the Isle of Jersey to Miss Augusta Blanche Bennett.

MR. W. W. S. BUTLER, superintendent of the Montoursville Passenger Railway and the Lewisburg, Milton & Watsonstown Passenger Railway, of Pennsylvania, has resigned from these companies, his resignation becoming effective April 1. Mr. Butler will become superintendent of the Durham Traction Company, of Durham, N. C., which is now constructing a new line at Durham.

MR. J. C. BOYD has just resigned as roadmaster of the elevated division of the Boston Elevated Railway Company, owing, it is understood, to the advice of his physician, that this work was more severe than the present state of his health would justify him in continuing. Mr. Boyd's resignation took effect upon March 1, and was accepted with regret by the company's officials, with whom his relations have always been exceedingly cordial. It is understood that Mr. Boyd will return to his former home in Maine, where he may accept a position with the Bangor & Aroostook Railroad, with which he was formerly connected. Mr. F. C. Stowell, assistant roadmaster of the southern division of the Boston & Maine Railroad Company, has been appointed to succeed Mr. Boyd. Mr. Stowell is a civil engineer and a graduate of Harvard College, where he studied engineering in the Lawrence Scientific School. He was formerly assistant engineer of the old Boston & Lowell Railroad, and continued in the same position after the lease of that road to the Boston & Maine Railroad. In 1894 he was appointed assistant roadmaster of the southern division of that company and was given charge of what used to be the Central Massachusetts Railroad, in which position he has served ever since. For the last seven years he has been secretary of the Eastern Roadmasters' Association, which includes all the railroads of New England, Eastern New York and Eastern Canada.

FINANCIAL INTELLIGENCE

THE MARKET

The Money Market

WALL STREET, March 12, 1902.

Expectations of a firmer money market have been realized to some extent during the past week. Money on call, which was loaning a week ago quite freely at $2\frac{1}{2}$ per cent, is now not loaning below 3, and 4 per cent has been recorded on a few transactions. Time money is nominally unchanged at 4 per cent for the shorter loans, and $4\frac{1}{2}$ per cent for the distant maturities, but the supply of money, even at the latter rate, is extremely limited. As these articles have already pointed out, there is no warrant for anything approaching a serious stringency, because the causes that have brought bank reserves to their present low level are not the sort that would persist in the face of an advance in money quotations. It is because money has been so remarkably easy here that gold exports have gone on so extensively during the last fortnight, and that the syndicates and other large borrowers have been allowed to pile up loans so heavily. Both of these movements have ceased now that the money market has begun to harden. Sterling exchange has dropped off well below the specie shipping point, and what promises to be an important contraction in the loan account has already begun. The whole money situation seems, in fact, to be capable of righting itself easily, with only a slight rise in the money rate. Unquestionably such a rise will bring funds in quantity from the interior centers; indeed, the recovery in interior exchange during the last day or two shows that this result is already being witnessed. The common understanding is, moreover, that the local trust companies and other institutions outside the Clearing House have borne a comparatively small part in the winter's loan expansion, and that with the more profitable condition promised in the loan market they will begin to draw down their cash balances in the depository banks, and lend them out. This operation will, of course, cause the desired reduction of loans and deposit liabilities among the Clearing House members, without curtailing the supply of credit available for the community in general. Surplus reserve ought to gain enough through increasing currency offerings from the domestic centers and through loan contraction, to meet any further losses at the Treasury or elsewhere. The chances are that money quotations will remain somewhat higher than their recent average for a while to come, but there is little chance of any serious disturbance.

The Stock Market

The general share market has scarcely changed in any of its main characteristics from what it was a week ago. Considering the uncertainty attending the money outlook, the Northern Securities affair, and the new grain harvests, the undertone has been remarkably firm. A good many specialties have been bid up sharply, and in this group the high-grade investment issues—like Northwest, General Electric and Pullman Palace Car—have figured alongside the veriest trash of the industrial and railroad low-priced stock list. Judging the market in the proper manner, however, by the movement of the regularly active shares, the range of fluctuations has been insignificant, and net changes very small. The causes of public indifference to new speculative ventures have been alluded to too frequently already to need rehearsal now. On the other hand, it is equally plain that there is no desire to sell on the part of outside investors, and the Wall Street syndicates which own and control the greater part of the available security supply cannot, even if they would, reduce their commitments materially. It requires only a minimum of support when the market grows weak to check the decline, and only a minimum of realizing orders to check the advance whenever the drift is upward. Except for some decrease in railway earnings in the Southwest and in other sections, where the storms and floods have delayed traffic, developments outside the Stock Exchange continue favorable, and afford an ample ground for maintaining high security values. The market bids fair to continue for some time to move in narrow channels, and to be discriminating as regards stocks where special considerations of price or earning power are relatively more favorable than others. As yet no impulse to a general movement either backward or forward has appeared or seems likely to appear.

Among the local traction stocks, Manhattan is the only one that deserves particular notice for its market experience of the past week. It has been one of the weakest features in the entire Stock Exchange dealings for no reason apparently except that the current manipulation is directed to getting the price down rather than up. No opportunity has been lost to mark the stock down as far

as possible on all occasions of general weakness, while no attempt at all has been made to bid up the quotation when the general tendency has been toward recovery. No liquidation has occurred at all commensurate either in volume or importance with the extent of the decline. Partly for this reason, and partly because "bear" manipulation is so evident, the suspicion is raised that the stock is being depressed without the interference, if not actually with the co-operation of, the inside speculative interests for the purpose of accumulation. The earnings of the road are known to be enormous, and some authorities who have means of supporting their statements claim that enough is being earned to pay 10 per cent on the present capital, to say nothing of further increases under electric equipment. Metropolitan has gone lower more from neglect than from any other cause. Nothing more is heard of the opposition which was lately organized to the securities-holding plan. Brooklyn Rapid Transit has been comparatively inactive, and realizing sales have been more in evidence than new buying.

Philadelphia

Active trading has continued in Union Traction during the week, but with scarcely any change in prices. Nearly all the transactions have averaged around $39\frac{1}{2}$. The speculative rank and file are still awaiting more definite details of the terms which the new Consolidated Traction Company will offer for the lease of the Union Traction. It is said that the new enterprise contemplates the building of a 3-mile subway and an elevated road above it. Regarding the terms of the deal the report is that one-fourth of the stock of the new company will be allotted at par value of \$50 to the general body of present Union Traction stockholders, and that the Widener-Elkins-Dolan syndicate will take the rest. Philadelphia Traction has sold in only small parcels during the week at 100 and $100\frac{1}{8}$. The general traction list in Philadelphia has been extremely dull. Insignificant sales are reported in Consolidated of New Jersey at $70\frac{3}{8}$, Indianapolis Railway at 48, Easton Electric at $19\frac{1}{2}$, American Railways at $43\frac{3}{4}$ and 43, and Railways General at $6\frac{1}{8}$. Bond sales comprise Electric-People's Traction 4s at $98\frac{1}{4}$, People's Passenger 4s at $106\frac{1}{2}$, Union Traction of Indiana 5s at 101, Indianapolis 4s at 85, and Consolidated of New Jersey 5s at $110\frac{1}{2}$ to $110\frac{3}{8}$. The effect on the Cleveland Stock Exchange of the contemplated street railway consolidation was marked last week by strengthening both Little and Big Consolidated. The former opened at $81\frac{1}{2}$ and advanced to $85\frac{3}{4}$ bid and $87\frac{1}{2}$ asked. Cleveland City continued strong at about 115. Southern Ohio Traction attracted attention late in the week, several small blocks going at 57 and 58; the last sale was at $78\frac{1}{2}$. Northern Ohio Traction was strong, several blocks selling at $34\frac{1}{2}$, an advance of four points. Detroit United stood about stationary at $69\frac{1}{2}$ during the week. Two passed dividends are accountable for the drop in Southern Ohio. On Monday Detroit United sold at $69\frac{3}{8}$.

Chicago

Nothing further has been heard this week about the rumored street railway consolidation in Chicago. Heavy dealings in Union Traction have taken place all around the single price, 15. The preferred is steady at 49. No sales of City Railway are reported. Among the elevated securities Metropolitan has been most conspicuous. The preferred stock has changed hands steadily at 90 to $90\frac{1}{2}$. The common, after selling up to $41\frac{1}{2}$ at the end of last week, is back to $39\frac{1}{2}$, but even this represents a decided gain over recent quotations. The opening of the road's Douglas Park extension has been followed by the announcement of the purchase of property valued at \$771,000, running from Market Street to Fifth Avenue, which will be used as an extra terminal to relieve the overworked Union loop. As the lease of the latter by the Metropolitan and the rest calls for one-half cent on each passenger, it is expected that when the Metropolitan has its own terminal facilities for a good part of its traffic, a large saving in earnings will be accomplished. At present 10 per cent of its gross revenue is turned over to the "loop" company. Of the other elevated shares, South Side, on scattering transactions, has sold up as high as 112, while Lake Street has been strong at $115\frac{1}{8}$. The third track of the latter company has now been completely laid, and will be open to traffic soon. There are no developments yet in the critically interesting matter of the traction company franchise taxes.

Other Traction Securities

Liquidation in Boston Elevated, which carried the price down as low as $161\frac{1}{2}$ a fortnight ago, has abruptly ceased, and it took the purchase of only 150 shares to send the stock up to $165\frac{1}{2}$ last Thursday. Since then the advance has continued, 168 being the last sale yesterday. Massachusetts Electric issues have been

dealt in freely, but with little change in prices. The recent advance in both common and preferred is well held. Fears that the bill compelling the sale of "six tickets for a quarter" will pass the Maryland Legislature, caused a sharp reaction in the United Railway of Baltimore securities on Wednesday a week ago. Both common stock and income bonds were down a point and one-half from their recent top. During the last few days some recovery has occurred, and more reliance is placed upon the semi-official assurances that the undesirable legislation will not be enacted. Other Baltimore sales for the week comprise Charleston Railway 5s at 105 $\frac{5}{8}$ up to 106, Atlantic Railway 5s at 106 $\frac{3}{4}$ and 107, City and Suburban (Baltimore) 5s at 106, Norfolk Railway 5s at 110 $\frac{1}{2}$, and Baltimore Traction 5s at 118 $\frac{1}{4}$. St. Louis Transit and United of St. Louis preferred has sold as low as 27 $\frac{1}{8}$ and 82 $\frac{1}{4}$ respectively, on light dealings. The decline in these issues has come so suddenly as to suggest that the recent advance was very largely speculative in character. Apart from the St. Louis shares, interest in the New York curb dealings has been confined to the new San Francisco Street Railway securities. The first quotations a week ago were 103 to 103 $\frac{1}{2}$ for the "subscriptions," 88 bid for the bonds, 20 $\frac{1}{2}$ bid for the common, and 60 $\frac{1}{2}$ for the preferred stock. Since then the subscriptions have sold down on heavy dealings to 100 $\frac{3}{4}$, but the common stock has changed hands freely at 23 $\frac{1}{2}$, and the preferred at 63 $\frac{3}{4}$. Small sales of City Railroad preferred certificates in the New Orleans market are reported at 105, a decline of one-half point. The common is unchanged at 30 $\frac{1}{2}$ bid.

Security Quotations

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

	Closing 1902	Bid March 4	Bid March 11
American Railways Company.....	43 $\frac{1}{4}$	43	43
Boston Elevated	161	167	167
Brooklyn R. T.....	63 $\frac{3}{8}$	63 $\frac{3}{8}$	63 $\frac{3}{8}$
Chicago City	214	215	215
Chicago Union Tr. common.....	14 $\frac{1}{2}$	14 $\frac{1}{2}$	14 $\frac{1}{2}$
Chicago Union Tr. (preferred).....	50	48 $\frac{1}{2}$	48 $\frac{1}{2}$
Cleveland City	107	107
Cleveland & Eastern	30	a30	a30
Cleveland Electric	81	84 $\frac{3}{4}$	84 $\frac{3}{4}$
Columbus (common)	51	50	50
Columbus (preferred)	102	102	102
Consolidated Traction of N. J.....	70	70	70
Consolidated Traction of N. J. 5s.....	110 $\frac{1}{4}$	110 $\frac{1}{4}$	110 $\frac{1}{4}$
Consolidated Traction of Pittsburgh (common).....	24 $\frac{3}{8}$	24 $\frac{3}{8}$	24 $\frac{3}{8}$
Consolidated Traction of Pittsburgh (preferred).....	64 $\frac{1}{2}$	64 $\frac{1}{2}$	64 $\frac{1}{2}$
Detroit United	67 $\frac{5}{8}$	69 $\frac{1}{4}$	69 $\frac{1}{4}$
Detroit United Certificates.....	..	†66	†66
Electric-People's Traction (Philadelphia) 4s.....	99	98 $\frac{1}{2}$	98 $\frac{1}{2}$
Elgin, Aurora & Southern.....	a35 $\frac{1}{2}$	34	34
Indianapolis Street Railway 4s.....	85	85	85
Lake Street Elevated.....	11 $\frac{1}{2}$	11 $\frac{1}{4}$	11 $\frac{1}{4}$
Manhattan Ry.	131	128 $\frac{1}{4}$	128 $\frac{1}{4}$
Massachusetts Elec. Cos. (common).....	36	36	36
Massachusetts Elec. Cos. (preferred).....	96	96 $\frac{3}{4}$	96 $\frac{3}{4}$
Metropolitan Elevated, Chicago (common).....	39 $\frac{1}{2}$	40	40
Metropolitan Elevated, Chicago.....	89	†90 $\frac{1}{2}$	†90 $\frac{1}{2}$
Metropolitan Street	167 $\frac{1}{4}$	167	167
New Orleans (common)	30 $\frac{5}{8}$	30 $\frac{1}{2}$	30 $\frac{1}{2}$
New Orleans (preferred)	105 $\frac{1}{2}$	104 $\frac{3}{4}$	104 $\frac{3}{4}$
North American	92	96	96
Northern Ohio Traction (common).....	30	33 $\frac{1}{2}$	33 $\frac{1}{2}$
Northern Ohio Traction (preferred).....	90	85	85
North Jersey	28	28	28
Northwestern Elevated, Chicago (common).....	38 $\frac{1}{2}$	38 $\frac{1}{2}$	38 $\frac{1}{2}$
Northwestern Elevated, Chicago (preferred).....	86	86	86
Philadelphia Traction	100	100	100
St. Louis Transit Co. (common).....	30 $\frac{3}{4}$	26	26
South Side Elevated (Chicago).....	110 $\frac{1}{2}$	112	112
Southern Ohio Traction.....	65	a60	a60
Syracuse (common)	21	21	21
Syracuse (preferred)	61	61	61
Third Ave.	129	129	129
Twin City, Minneapolis (common).....	113	115 $\frac{1}{2}$	115 $\frac{1}{2}$
United Railways, St. Louis (preferred).....	83 $\frac{1}{2}$	82 $\frac{1}{4}$	82 $\frac{1}{4}$
United Railways, St. Louis, 4s.....	89	87 $\frac{1}{2}$	87 $\frac{1}{2}$
Union Traction (Philadelphia).....	39 $\frac{5}{8}$	39 $\frac{1}{2}$	39 $\frac{1}{2}$

* Ex-dividend. (a) Asked. † Last sale.

Iron and Steel

The already serious difficulty of supply keeping pace with demand in the iron market has been increased by the delay in transportation services, owing to the recent floods and storms. It is unfortunate that this should occur at a time when the accumulation of finished material for the spring trade is at its height. The *Iron Age* sub-

mits a fresh series of figures dealing with the foundry iron trade in the South which throw additional light upon the enormous volume of current consumption. It seems that with an estimated production of 475,000 tons during the remaining ten months of the year the Southern furnaces had already, on March 1, booked orders for 800,000 tons. Prices are advancing steadily despite all the efforts of the leading producers to hold them down. Bessemer pig is quoted now at \$17, steel billets at \$31, and steel rails at \$28.

Metals.

Quotations for the leading metals are as follows: Copper, lake, 12 $\frac{1}{4}$ cents; tin, 26 $\frac{1}{2}$ cents; lead, 4 $\frac{1}{8}$ cents, and spelter, 4 $\frac{1}{4}$ cents.

SAN FRANCISCO, CAL.—The Sutter Street and Sutro Railway lines have been formally transferred to the Baltimore syndicate, whose representative has tendered a certified check for \$2,376,656 in payment. The transfer of the Market Street system is yet to be made. About \$3,000,000 worth of stock in the United Railways Company, which will control all these lines, has been taken by local capitalists.

WABASH, IND.—General Manager Lau, of the Wabash River Traction Company, operating between Wabash and Peru, announces the sale of the entire issue of \$300,000 5 per cent bonds authorized by the company, at a fraction over 95. The sale of the bonds yielded over \$270,000, and this will be used in building the Peru line, or to build a new line to Marion. The company is also seeking the right of way through the counties of Marion and Cass to Logansport.

AMHERST, MASS.—The Amherst & Sunderland Street Railway Company has petitioned the Railroad Commissioners for authority to issue additional capital stock to the amount of \$40,000 for improving its machinery.

WESTBORO, MASS.—The Westboro & Hopkinton Street Railway Company has petitioned the Railroad Commissioners for authority to issue additional capital stock to the amount of \$40,000.

BOSTON, MASS.—In accordance with the provisions of the lease of the West End Street Railway Company to the Boston Elevated Railway Company, a dividend rental of \$1.75 per share will be paid to holders of record of the common stock of the West End Company on April 1.

GRAND RAPIDS, MICH.—It is understood that the Grand Rapids, Holland & Lake Michigan Railway will pass into the hands of the bondholders within a month, and that the company will be entirely reorganized.

MINNEAPOLIS, MINN.—The Twin City Rapid Transit has declared the regular quarterly dividend of 1 $\frac{1}{4}$ per cent, payable April 1.

ST. LOUIS, MO.—Clark Brothers, of Philadelphia, last week purchased the St. Louis and East St. Louis Electric Railway, commonly known as the bridge line, which operates over the Eads Bridge. The week before they purchased the East St. Louis Electric road, and it is intimated that these two roads will be connected, a strip of track about three feet being all that will be necessary to connect them. All told, the Clarks have acquired 125 miles of single track. The investment represents an outlay of \$4,000,000, and \$1,000,000 additional is to be spent at once in improvements, including additional power houses, equipment, etc. It is reported that the company has made arrangements with the St. Louis Transit Company for the use of some of its tracks for a loop.

NEW YORK, N. Y.—The directors of the Manhattan Elevated Railway have declared the regular quarterly dividend of 1 per cent, payable April 1.

NEW YORK, N. Y.—The American Light & Traction Company reports earnings for January at \$88,373, being an increase over January, 1901, of 21.49 per cent. Required to pay one month's dividends on \$7,746,000 preferred, \$38,730; surplus for month, \$49,643. The surplus for six months, after having paid dividends of 3 per cent for the half year ended Dec. 31, 1901, was \$187,952, which, added to the foregoing surplus, gives a surplus for seven months ended Jan. 31, 1902, of \$237,596.

TOLEDO, OHIO.—An issue of \$50,000 in receiver's certificates on the Lake Shore Electric Railway has been sold in Toledo and Detroit. The certificates pay 6 per cent interest and are due Jan. 1, 1903. The certificates are prior liens even over first-mortgage bonds. The money obtained is being used for improvements to the property.

PROVIDENCE, R. I.—The merger of the United Traction, capitalized at \$8,400,000; Providence Gas Company, with \$5,000,000 in stock, and the Narragansett Electric Lighting Companies, capitalized at \$2,750,000, is announced. The consolidated companies will be known as the Rhode Island Company, and there has just been introduced in the Assembly of Rhode Island an act to provide for the organization of the company.

ALBANY, N. Y.—The Albany & Hudson Railway & Power Company has filed with the State Railroad Commissioners the following report for the quarter ending Dec. 31, 1901:

Gross earnings	\$32,766
Operating expenses	30,211
Net earnings	\$2,555
Other income	9,354
Gross income	\$11,909
Fixed charges	33,134

Deficit

MONTREAL, QUE.—The Montreal Street Railway Company has decided that in pursuance of a resolution adopted at the special meeting of the shareholders, held July 10, 1901, for the purpose of providing for the purchase of the securities of the Montreal Park & Island Railway Company, that the company issue \$1,500,000 of 4 $\frac{1}{2}$ per cent bonds, the same to be offered to shareholders at par pro rata to their holding of stock, April 15, 1902.

TABLE OF OPERATING STATISTICS

Notice.—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. * Including taxes. † Deficit.

Table with columns: COMPANY, Period, Total Gross Earnings, Operating Expenses, Net Earnings, Deductions From Income, Net Income, Amount Available for Dividends. Rows include companies like AKRON, O., ALBANY, N. Y., AUGUSTA, GA., BINGHAMTON, N. Y., BOSTON, MASS., BROOKLYN, N. Y., BUFFALO, N. Y., CHICAGO, ILL., CLEVELAND, O., DENVER, COL., DETROIT, MICH., DULUTH, MINN., ELGIN, ILL., HAMILTON, O., LONDON, ONT., MILWAUKEE, WIS., MINNEAPOLIS, MINN., MONTREAL, CAN., NEW YORK CITY, OLEAN, N. Y., PITTSBURG, PA., PHILADELPHIA, PA., RICHMOND, VA., ROCHESTER, N. Y., SCRANTON, PA., SCHENECTADY, N. Y., SYRACUSE, N. Y., TOLEDO, O., W. NEW BRIGHTON, S. I., Staten Island El.