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

Of this issue of the Street Railway Journal 8000 copies are printed. Total circulation for 1907 to date 246,350 copies, an average of 8211 copies per week.

The Scope of the Purchasing Agent

If there could be a race between individuals whose duties call for some knowledge of a wide variety of subjects, the purchasing agent of many an electric railway would run a close second to the daily newspaper man. There are com-

panies where the purchasing agent is little more than a clerk who receives requisitions from department heads for different makes of material and in rewriting them for transmission adds only such details as relate to shipment and payment. On other roads the wishes of the heads of the departments requiring the goods are often largely ignored because the purchasing agent is required to place the order with the lowest bidder.

It is clear that neither of these methods is ideal. If the engineers, master mechanics or other officials can specify at will what they want to use, their natural predilection for the higher-priced product may not only soon exhaust their department appropriations, but the consequent scattering of purchasing power weakens the organization and introduces chances for corruption. On the other hand, simply to give an order to a solicitor for business because his bid is the lowest is not productive of true economy in the long run and offers to the manufacturer a constant temptation to lower the quality of his material.

However experienced a purchasing agent may be, he cannot be expected to know everything, yet he should be entrenched in a position where he can properly gage the wants of every branch of the company and keep the expense account within reasonable limits. He should be able to determine the economic relation between differences in first cost and differences in length of service, two qualities which are rarely in exact ratio. While he may be guided largely by the advice of the department chief, he cannot shift the responsibility of his office or the duties which he owes to the general manager of the company under whose direction he usually works. Whether he selects the more expensive or the less expensive article, he should be prepared to justify his choice as being the one most economical in the long run if called upon to do so by the officer directly in charge of his department.

Advertising Trolley Facilities at Steam Railroad Stations

Much more might be done by progressive electric railways in the line of advertising their facilities at the stations of steam railroads in their territory. The idea prevails that such a course is equivalent to bearding the competitive lion in his den, but we question if this is the true point of view. Sharp competition between steam and trolley service exists in a great many places, but in general the idea is fast spreading that the trolley roads and the steam lines are supplementary to one another, and as fast as figures are made public in districts where there is considerable traveling the truth of this relation is being surely established.

There certainly can be little objection on the part of the steam road to the advertising of non-competitive service around a city by the local trolley system. The news stands generally are provided with trolley guides, and nothing is gained in the long run by hindering the free movement of

travel. When the local trolley lines constitute the principle link between the steam station and the center of the town the fact should be advertised by an illuminated or plain sign in or near the steam terminal or through station, or by a clearly printed and conspicuously posted schedule in a place that will catch the eye of the stranger who has come to the town. One instinctively glances about a station on alighting from a train for the first time in a new town, and in the rare cases where a local trolley schedule meets the eye, the satisfaction is great and the reward of the trolley company reasonably sure. The trouble is that the street railway company does not always realize the competition it must meet in the way of hacks and cabs, with the result that ten, fifteen or twenty nickels are spent by the stranger sometimes for a ride of less than two blocks—the most profitable of all passengers for the railway company to carry. There are ways enough of advertising trolley facilities without going into details here; the point we wish to make is that there is a growing need of such publicity work in the steam railroad stations, and we believe that if the steam railroad people are approached in the right way, a mutually helpful co-operation will result. Electric railways deliver many passengers to the steam roads through the knowledge car conductors have of the latter's schedules, and there is no reason why the rule should not work both ways in the future.

The Deformation and Wear of Wheels and Rails

The paper by H. R. A. Mallock before the Institution of Civil Engineers which was published in our issue of July 13, and the discussion that followed it, deserve more than a passing attention on the part of engineers in this country. Many statements are made, both in the original paper and the discussion, that tally closely with investigations that have been made here, while there are some in which there is a marked difference. The weak point in the paper when considered from the standpoint of practical work is the assumption on the part of the author that the wheel and the rail are of the same material. This not only does not hold for a steel wheel on a steel rail, but is far from the truth when a chilled cast-iron wheel on a steel rail is considered. As far as American practice is concerned, the higher carbon content of the steel tire, together with the mechanical and heat treatment which it receives, produces a different quality of metal from that found in the head of the rail, so that the assumption that the compression of wheel and rail is the same under the load will not hold. Unfortunately, Mr. Mallock did not explain the method by which he measured the curvature of the area of contact between the wheel and rail; how he found that it was a circle, "and that the radius of this circle is twice the radius of the wheel." Whether this is the case when the metal of wheel and rail is the same, according to the assumption, we are not prepared to say, but investigations along the same line in this country have led to the conclusion that this is not the case when the metals of the wheel and rail are different.

Attention has already been called in this paper to the fact that after the imposition of an excessive load upon the rail by the wheel, a visible depression is made in the rail, while nothing of the sort can be detected in the wheel.

Now, if the depression in the wheel and the rail were the same, it would appear to be quite contrary to the natural order of things for the wheel to recover its shape and the rail not to do so. Furthermore, it has been found that the depression made in the rail by a cast-iron wheel is greater than that made by a wheel with a steel tire, so that there is an earlier breaking down of the metal. Observations, then, that have been made in practical working in this country go to show that the radius of the curve of the area of contact of the wheel and rail is much shorter than twice the radius of the wheel, but as to just what it is, measurements have not been taken.

If, then, the rate of depression given by the author is not conceded, the calculations made regarding the maximum pressure at the center of the area of contact must be modified. But regarding this it is quite well agreed that the pressure existing at the center of the area of contact is much in excess of the average and is quite sufficient to account for the breaking down and flow of the metal of the head, which would undoubtedly be much in excess of what it is were it not for the influence of the time interval to which attention was called in the discussion.

The influence of wheel diameter does not seem to be really as great as it was assumed to be. Not but that this dimension is of some importance, but as far as the tangible results of a vertical load are concerned, there seems to be little difference between wide variations of diameter; so that when we compare the effects of wheels whose diameters run from 33 ins. to 36 ins. as they do on most electric cars, the difference in effect on the track is probably infinitesimal.

Towards the close of the discussion the matter of corrugated rails was brought to the front, but nothing new was evolved, and the whole subject still remains one of scientific guessing that it has been from the first. That this most important branch of the subject involving the annual destruction of thousands of tons of rails, should be left without any persistent course of investigation by which the real cause is to be run to earth is very strange.

The statement of one speaker that "the greatest strain when a wheel passed over a rail was not at the bottom or lowest fiber of the span, but at the top, produced by the local action of the wheel," is exactly in accord with the results of practice. Unfortunately, we are still in the dark as to the penetration of the effect of loading into both wheel and rail, and it holds for almost everything that was said upon the subject at the meeting, that the statements can neither be proven nor contradicted. We simply know that the rail-wear under the present conditions of heavy loading is enormous, both in rate and total magnitude. It also appears from recent investigations that the shape of the rail-head and wheel-tread have a most important effect, not only upon the wearing qualities of each, but also upon the tractive power required to pull the car. From investigations made along these lines the indications are that when air resistance, journal friction and direct rolling resistance have all been subtracted from the total, there will still remain a considerable portion that is attributable only to the frictional resistance of the wheel against the rail. These investigations have not yet been pushed far enough to make

it possible to offer any direct recommendations as to the best forms to adopt. This much is certain, that a great deal of work still remains to be done before we will be in a position to state what form of wheel and rail, and what amount of loading will produce the most satisfactory conditions of wheel and rail deformation and wear.

Labor Under Municipal Ownership

The reports on municipal ownership drawn up by the National Civic Federation, which we are abstracting, are like all such reports, somewhat unsatisfactory. Municipal ownership seems to be one of those subjects toward which no man is able consistently to present an open mind. Someone has truly said that all mankind divides itself into the radical and conservative, seldom or never providing an intermediate stratum. So likewise it is with the question of municipal ownership. Men are either for it or against it, and that strongly. One sees municipal ownership as through rose-colored glasses, and another through spectacles of deepest saffron.

It therefore happens that the reports of Mr. Sullivan and Professor Commons, which we published last week and which discuss the labor situation, present radically different views of even facts bearing upon municipal ownership. The mind of academic inclination is nearly always inclined to look at the matter from a purely theoretical standpoint, seeing merely the obvious advantage of communal administration, without full appreciation of its very grave, practical disadvantages.

There seems to be little doubt that in this country the employees of municipal plants are likely to receive slightly better wages than the employees of private plants, and to toil somewhat shorter hours. This extra cost of labor is, in fact, one of the handicaps of municipal ownership in America. The extra advantages, unfortunately, do not represent a more liberal policy or a higher grade of labor, but merely a species of largesse, to which municipal employees, by custom, seem to consider themselves entitled. In fact, the American practical politician in the average American city government seems to have drifted towards a species of applied socialism, and certain citizens at large are taxed in proportion to their means, to support in semi-idleness the ever increasing guild of municipal parasites.

A great difficulty in operating municipal plants of every kind is in the entrance of politics into the administration, causing, among other evils, abnormally high pay for abnormally inefficient labor, and the result is usually disastrous. Even the civil service system sometimes, in one way or another, applied to municipal appointments, does not rob them of their political character, and merely makes it the more difficult to discharge incompetent men. In some cities employees appointed directly or indirectly through political influence, can be removed only after the preferment of charges and a trial before the Mayor, possibly the same Mayor who appointed the incumbent. Under such conditions it is well nigh impossible to get rid of inefficient labor. It is doubtless true that some employees in municipal plants gain advantage in wages and hours of labor, but they generally do it through political activity and at the ex-

pense of their brother workmen, who are less active or more scrupulous.

We do not believe that the best interests of labor, organized or unorganized, are served by the existence of a class of particularly well paid city employees, who look to the ward primaries rather than to their individual ability, or their fraternal relations with other workmen, for the retention of their jobs. In private management a laborer, although not always well paid, stands in line for advancement. Whatever faults private employment may have it has generally the advantage of being worked on an informal but rather effective merit system which pushes a good man to the front and into higher pay. The upper strata of every street railway organization, for instance, are composed quite largely of men who have worked their way up from the ranks. Such opportunities are difficult to find in any municipal plant.

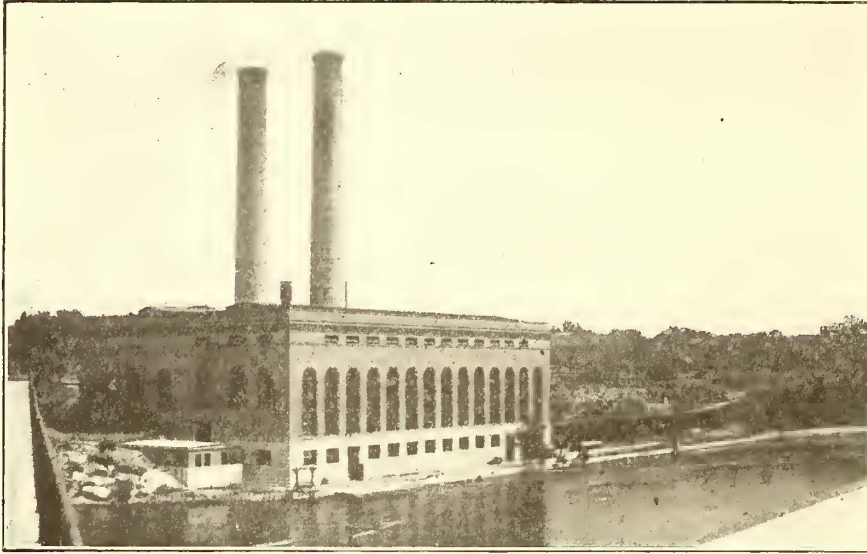
One cannot judge municipal ownership here, by municipal ownership abroad. While graft is not unknown in a British municipality, it seems to be generally admitted that the graft which exists is less wide-spread and less efficiently organized than in American cities. The electoral franchise is less nearly universal there than here and the potential machinery far less extensive and highly specialized. Under such conditions it is not surprising to find municipal workmen of a relatively higher class under considerably more stable employment than here. All this tends to a somewhat greater degree of success in municipal ownership than has been found in American cities. As we have remarked more than once, municipal ownership in Great Britain has been very often notoriously unsuccessful, and if this is true under the comparatively non-partisan management found abroad, what can we expect in this country? Wherever a municipal enterprise has been kept out of politics it has had at least a fighting chance for success. Wherever it is conspicuously in politics it is foredoomed to failure, and failure, not only from the standpoint of the citizen at large, but from the standpoint of the laboring classes; all are sharers in the loss which it occasions. And we have several times shown the municipal enterprises which are conspicuously successful are those which do not require a great force of employees having intimate relations with the whole body of citizens.

So far as labor unions are concerned they must, from necessity, stand with the great bulk of the citizens against municipal ownership. Municipal and governmental administration is of legal necessity non-union in principle if not in practice, and the union may get along peaceable enough with the municipal enterprise as it does for the most part with the private enterprise, but it gains nothing in the former case that it does not possess in the latter and is not even at liberty to make a formal contract with the employer, when that employer is the public rather than a private party.

Take it all in all, therefore, it seems to us that from a practical standpoint, the prospects of the laboring man are not improved, but rather damaged where municipal ownership is in force. The more technical conditions resulting from municipal ownership of street railway enterprises, as revealed in the reports of the National Civic Federation, will be discussed in a later issue.

THE STEAM POWER STATION OF THE TWIN CITY RAPID TRANSIT COMPANY, MINNEAPOLIS

The steam-driven electrical generating station of the Twin City Rapid Transit Company, of Minneapolis, has a normal rated capacity of 35,000 hp and an overload capacity of 50,-



THE MINNEAPOLIS POWER PLANT OF THE TWIN CITY RAPID TRANSIT COMPANY

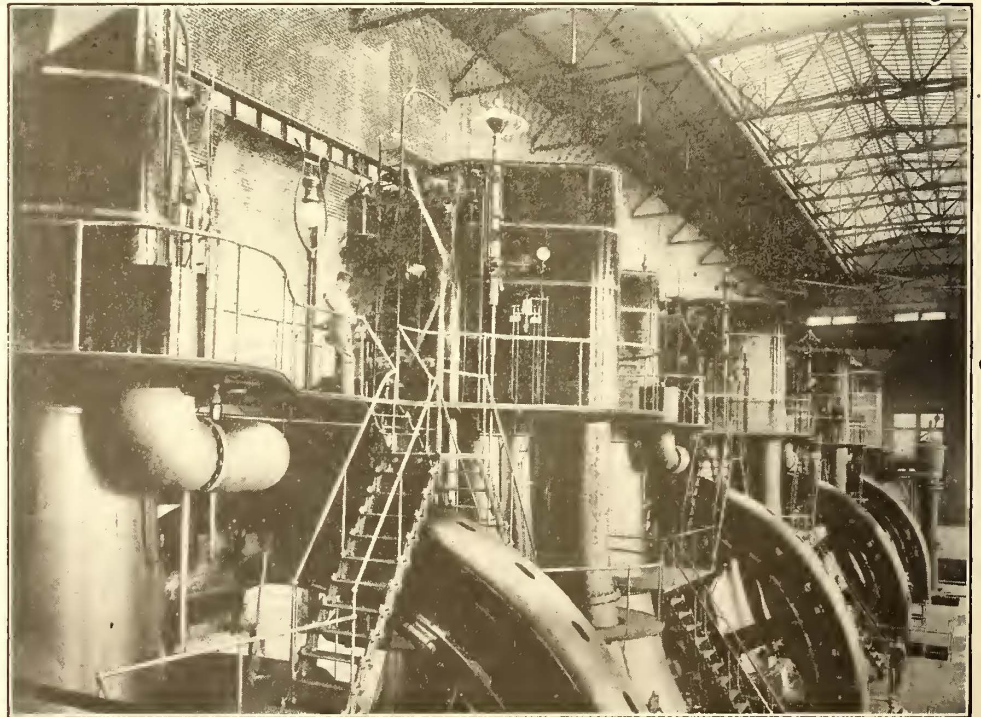
000 hp. The generating equipment of this station is operated in parallel with the equipment of a 10,000-hp hydroelectric station which is approximately 1000 ft. distant. The two stations furnish power to ten electric sub-stations in St. Paul and Minneapolis and in the adjacent towns, the maximum distance of transmission being about 25 miles. The generating equipment of the two stations delivers three-phase alternating current at 13,200 volts which rotary converters in the sub-stations transform to direct current at 600 volts. Each power station supplies about one-half the total requirements in kw-hours, the steam station taking the variations in the load, as shown on the typical load curve on page 127.

The steam power station is on the east bank of the Mississippi River just below the flour mills in the center of the city. It is in a brick building, 155 ft. 11 ins. by 225 ft. in plan and 93 ft. in height from the floor of the engine room basement to the roof. A 12-in. longitudinal brick wall divides the building into a boiler room and an engine room. The boiler room is 83 ft. wide, the full length of the building, and has a clear height to the roof girders of 52 ft., a basement 14 ft. high extending under its full length. The engine room is 67 ft. wide, the full length of the building, its floor being 4 ft. lower than

the boiler room floor. A basement 20 ft. high extends the full length of the building under the engine room.

The boiler room contains twenty-four 556-hp Babcock & Wilcox water-tube boilers, which are placed in two rows, with twelve boilers to the row. The fronts of the boilers in the rows face on a firing floor 14 ft. wide along the longitudinal center line of the room. The coal supply for the boilers is delivered to the station in cars on a switch which connects with the main line tracks of the Great Northern Railway. This switch extends the full length of the building close to the land side of the latter. Coal may be unloaded into a receiving hopper under the track and at one corner of the building, or on a 24-in. endless belt conveyor built by the Jeffrey Manufacturing Company, which extends the length of the building between the latter and the track and delivers coal to the receiving hopper. This conveyor is 205 ft. long from center to center of the coal pulleys, and when traveling at 280 ft. a minute has a capacity for handling 75 tons an hour. It is back-gearred to a 10-hp General Electric motor, which is enclosed in a dust-proof steel case. The

sideboards of the conveyor are 1½-in. oak plank attached to iron frames, those on the track side being built in sections which lean against the cars on the track and prevent coal falling under the latter as it is



INTERIOR OF ENGINE ROOM FROM THE SWITCHBOARD GALLERY

shoveled over the sides.

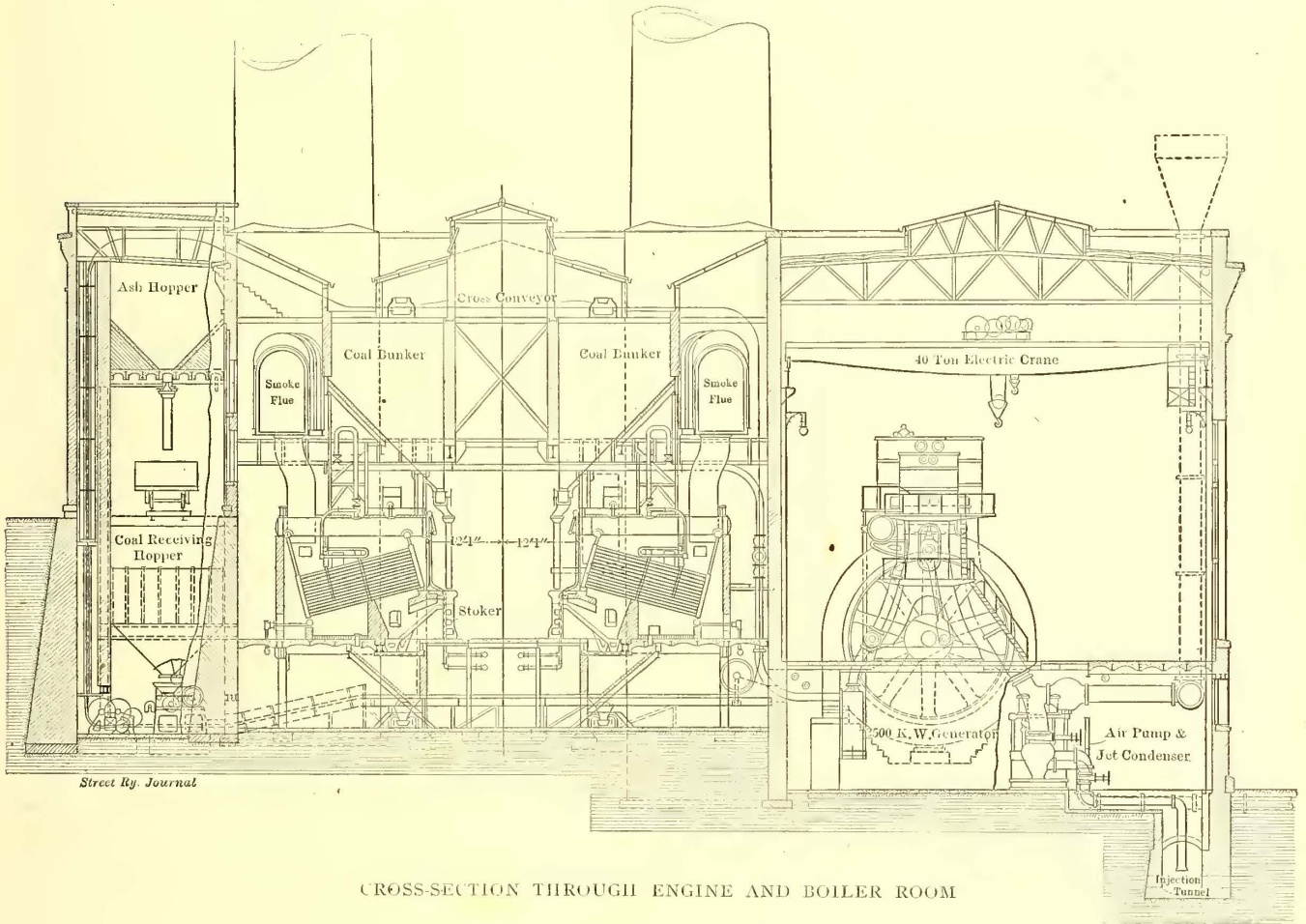
The receiving hopper at the end of the conveyor discharges into a single-drum McCaslin coal crusher in a room outside of one corner of the basement under the boiler room. Run-of-the-mine coal is generally received at the station and is all reduced by the crusher to pieces under

$\frac{3}{4}$ in. in maximum dimensions. The crusher delivers to a conveying system which supplies coal to bunkers directly above the boilers.

This conveying system is of the McCaslin gravity-overlapping-bucket type. It is comprised of a transverse conveyor, at the same end of the building as the coal crusher, and two longitudinal conveyors, one serving the bunkers over each row of boilers. The transverse conveyor runs horizontally from the crusher room to the opposite side of the building, then up the side of the latter to the roof girders, back horizontally just under these girders to the crusher side of the building, thence up over an ash hopper, which is directly over the unloading track along the side of the building, and down vertically to the coal crusher again. The two longitudinal conveyors extend horizon-

two boilers. The bunkers are of cinder concrete and are carried by a structural-steel frame. They are placed so a light well, 14 ft. wide the full length of the boiler room, is obtained between them, giving good light and ventilation to the whole boiler room and particularly to the firing room floor. The bottom of each bunker has six steel hoppers, which lead through under-cut gate valves, controlled from the firing floor by hand chains, to spouts feeding the stokers with which the boilers are equipped.

The stokers are of the Roney automatic type, with engine-driven rocking inclined grates having 111 sq. ft. of heating surface each. The fire arch of the boiler furnaces has a single span. The ashes are discharged from the stokers into ash hoppers in the basement. These hoppers are built of steel and are lined with fire brick. The ashes



CROSS-SECTION THROUGH ENGINE AND BOILER ROOM

tally under fronts of the boilers the length of the basement beneath the boiler room, up at the opposite end of the building to the roof, back horizontally over the bunkers to the transverse conveyor and down again to the basement. The transverse conveyor carries the coal from the crusher to either of the longitudinal conveyors into which the coal is automatically discharged. These conveyors elevate and distribute the coal to the bunkers over the boilers. The transverse conveyor is driven by a $7\frac{1}{2}$ -hp, 600-volt, direct-current motor; each longitudinal conveyor is driven by a 25-hp, 600-volt, direct-current motor. The motors are at the bottom of the down-takes in all three conveyors, and the apparatus for taking up slack in the conveyors is at the bottom of the up-takes.

Four coal bunkers, with a combined capacity of 2800 tons, are provided. Two of these bunkers are over each row of boilers, each bunker supplying three batteries of

are discharged from them through a gate at the bottom directly into the horizontal run of the longitudinal conveyors, the hoppers for one row of boilers being served by one conveyor and those of the other by the second. The conveyors elevate the ashes to the top of the building and discharge them into the upper horizontal run of the transverse conveyor, which carries them to the ash hopper over the unloading track along the building. This hopper is lined with cinder concrete and discharges at the bottom through a gate in a chute leading to cars on the track beneath it.

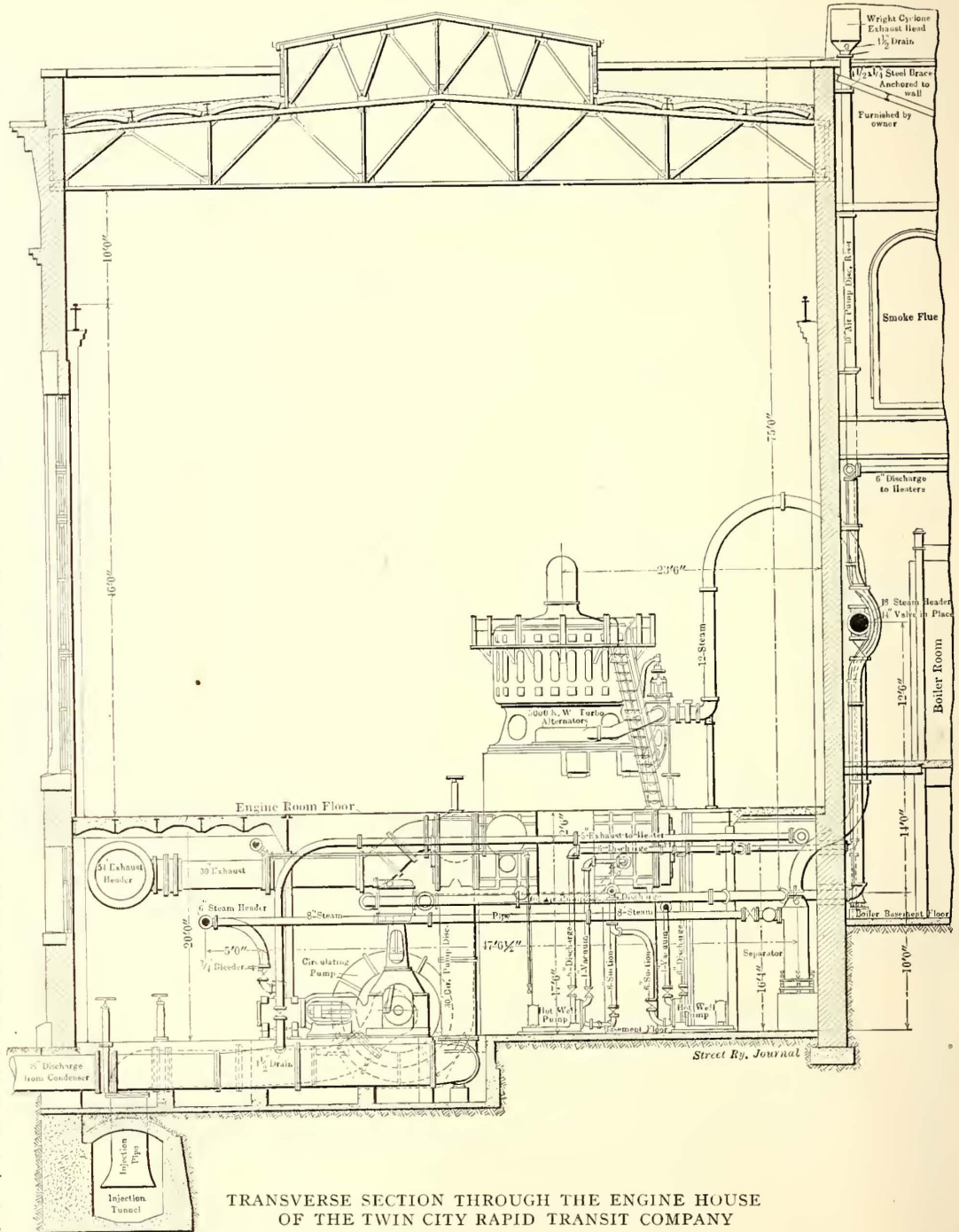
The boilers have a normal rated capacity of 556 hp each and a maximum capacity of 825 hp. They are operated at 180 lbs. pressure, and are equipped with Babcock & Wilcox superheaters, which are contained within the boiler settings just above the tubes of the boiler, and are capable of producing 100 degs. F. superheat. Each boiler has three

steam and water drums, 36 ins. in diameter and 23 ft. 3 ins. long. The boiler tubes are of the wrought-steel sectional type, 4 ins. in diameter and 18 ft. long, and are in twenty-one sections, of 13 tubes each, to the boiler. The total heating surface of each boiler is thus 5560 sq. ft., or 10.5 sq. ft. of heating surface to each square foot of grate area. Each row of boilers is served by an Alphonse Custodis hollow, radial molded brick stack, 162 ft. high and 16 ft. inside diameter. These stacks are placed on the transverse center line of the boiler room and are carried 63 ft. above the floor of that room, so they have a total height of 220 ft. above the furnaces. A smoke flue extends in both directions from each stack well above the settings of the boilers, the connection of each of the latter to these flues being made through a short vertical breeching.

The water supply of the station is taken from the river and is handled by four service pumps in the basement of the engine room. Owing to the presence of an objectionable amount of foreign matter in the river water all of the water used in the station is passed through a rapid sand filter plant built by the Norwood Engineering Company. This plant is in a detached brick building, 35 ft. 4 ins. x 48 ft. 8 ins. in plan, which has a concrete sub-structure and is at the upstream end of the main station building. Two horizontal simplex low-pressure Blake steam pumps, with a capacity of 600 gals. each, deliver water from the river or hot-well of the condensers to the filter plant.

The discharge from these pumps is an 8-in. pipe, which is controlled by a butterfly valve, and has its outlet in a sedimentation basin, 24 ft. x 33 ft. in plan and 17 ft. deep, within the filter building. When necessary, sulphate of alumina is applied to the raw water to assist in the removal of impurities. A sedimentation period of one and one-half hours is provided in the basin when the plant is operating at full capacity, and the basin is provided with baffles, so the coagulant has an opportunity to become flocculent

and to mix well with the water. The plant contains four filter beds, which are each 10 ft. x 13 ft. in plan, and have a combined capacity of 1200 gals. per minute. The filters contain 8 ins. of gravel, in three sizes, at the bottom, and then 28 ins. of sand. They are equipped with the usual strainer drainage and air wash systems. A 6-in. Lawrence centrifugal pump, operated by a 20-hp motor, provides water for washing the filters, and an 8 in. x 12-in.



air compressor driven by a pulley on the pump shaft furnishes air for agitating the sand during washing. A clear water well located under the filter beds forms a suction well for the other two service pumps.

This filter plant has been in service for a year and has proved to be particularly valuable in removing impurities from the raw water. The river is turbid at times and generally contains a considerable amount of raw sewage at the station; it also carries a large amount of bark produced

from the numerous wood-working industries above Minneapolis. The water from the hot-well is condensed steam from the engines and contains more or less oil. These various foreign matters are so completely removed by the filter plant that very little trouble is experienced with the boilers from the feed-water.

The two service pumps which draw from the clear well of the filter plant are of the Dean Bros. horizontal, duplex, double-acting type, and have a capacity of 1200 gals. each. These pumps deliver to the feed-water heaters.

Two open feed-water heaters, with a capacity of 350,000 gals. per hour each, are installed in the boiler room, one in each of the two spaces in front of the stacks. One of these heaters was built by the Stillwell-Bierce & Smith-Vaile Company and the other by the Platt Iron Works. They both have a 12-in. steam inlet and an 8-in. steam outlet; their water supply lines are 8 ins. in diameter and are provided with a regulating valve.

Six pumps supply water to the boilers from the feed-water heaters. Four of these are marine, vertical, double-acting, twin Dean Bros. pumps, with a normal capacity of 300 gals. per minute; the other two are Admiralty pattern, pot valve, vertical duplex Worthington pumps, each with a normal capacity of 600 gals. per minute. Two independent headers are supplied from the pair of Worthington pumps and two from the pair of twin Dean Bros. pumps, cross connections being made between the two corresponding pipes of the two sets of lines. These headers are in the basement immediately under the firing room floor, each boiler having a separate connection to two of them. The feed-water pumps are also connected so they can supply either hot or cold water to each header system.

A main live-steam header, 16 ins. in diameter, extends along the wall which separates the boiler room from the engine room. This header is in two sections, one on each side of the stack serving the row of boilers on that side. These sections are connected by a 14-in. loop with cut-off valves at each end. An 8-in. auxiliary header, with connections to the service pumps, air pumps and a steam-driven exciter unit in the engine room, is also provided. A battery of two boilers from each row is coupled with the battery across the firing floor from it and a 12-in. steam connection with the 16-in. header is provided for each of these sets of four boilers. This connection is reduced to 10 ins. in diameter from the first to the second battery. Each boiler of the set of four has a 7-in. connection with the main, connecting the set with the header. Two cut-off valves are provided on each of these 7-in. connections, and a cut-off valve is placed in each 12-in. connection at the header. Cut-off valves in the latter also provide for operating independently any one of the units in the engine room with steam from four boilers.

The engine room contains six main units, four reciprocating engines direct connected to engine generators, and two turbo-generator units. The four reciprocating units comprised the original installation in the engine room; the two turbine units are not yet quite ready for service, although they are installed. The original units have vertical cross-compound condensing 46 in. and 94 in. x 60-in. Allis-Chalmers engines without fly-wheels. These engines have a normal rated capacity of 500 ihp, with a steam consumption of 11½ lbs. per ihp-hour, the steam being at 175 lbs. gage pressure and 75 degs. F. superheat, and the engine exhausting into 26 ins. of vacuum and operating at 74¼ r. p. m. Under these same conditions the engines have a rated maximum capacity of 9000 ihp when running at 73

r. p. m. The engines are equipped with the Reynolds-Corliss valve gear having an automatic weighted governor operating both the high and low-pressure sides. The steam supply and exhaust valves are operated by separate eccentrics; the speed control is operated by a motor controlled from the switchboard. Each of these engines occupies a floor space of 17 ft. x 36 ft., and has an approximate height of 36 ft.

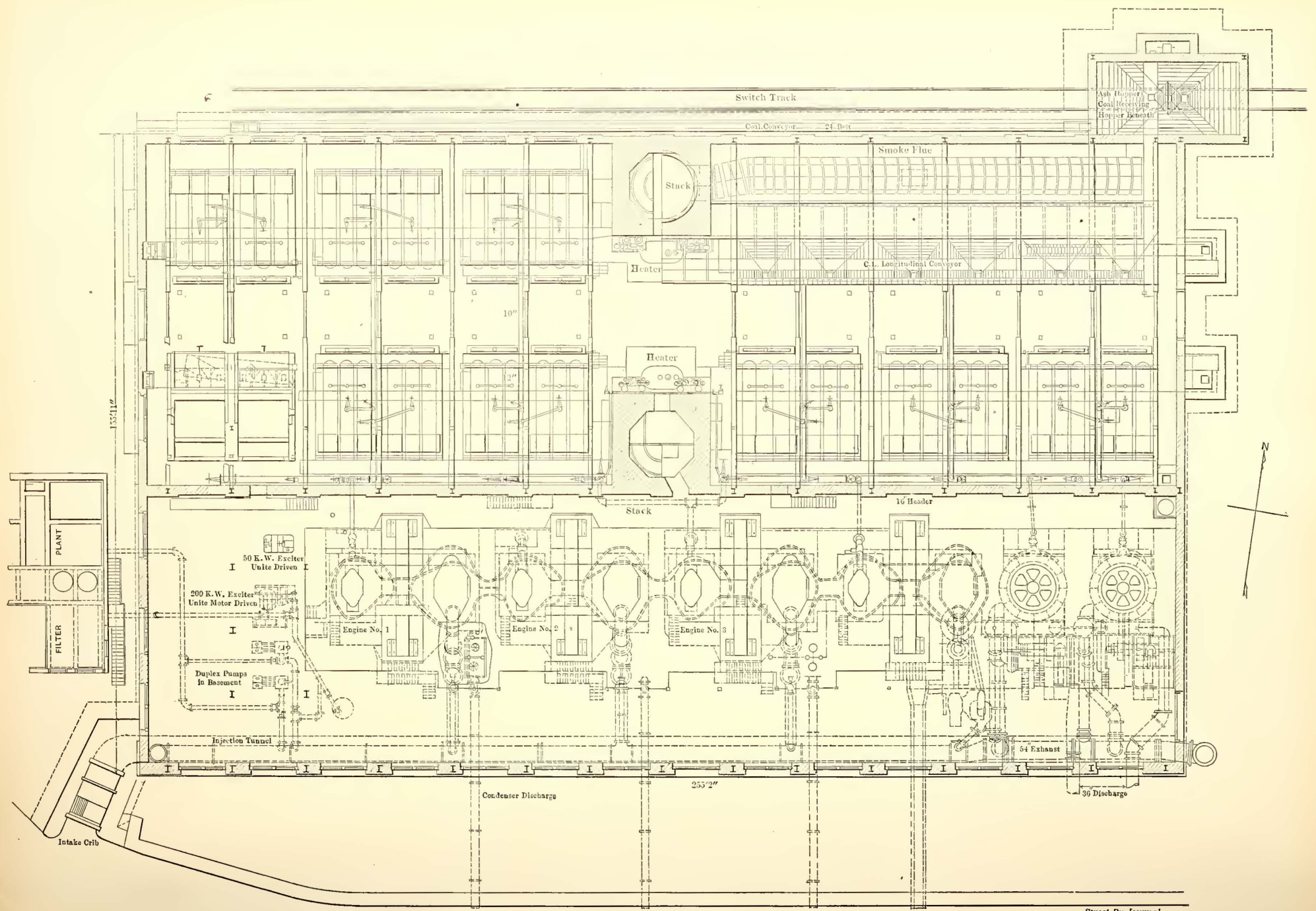
A three-phase, 35-cycle revolving-field fly-wheel type General Electric generator, capable of producing 3500 kw at 13,200 volts, is direct connected to each of the main engines. The revolving field of each generator is equivalent to a fly-wheel weighing 308,000 lbs at a radius of gyration of 12.2 ft. These generators each occupy a floor space of 8 ft. x 24 ft., and have an approximate height of 34 ft.

Three of the main engines are each provided with a vertical, twin, beam-connected 18-in. and 48-in. x 24-in. Blake air pump and jet condenser having a single-acting air end and a double-acting steam end. The pumps of these condensers draw from a 6-ft. x 8-ft. injection tunnel which extends from an intake in the river at the upstream end of the building under the engine room basement along the river side of the latter to the downstream end of the building. The cooling water is discharged from each condenser directly into the river.

The fourth engine is equipped with an Allis-Chalmers barometric-type condenser with the condenser chamber attached to the engine cylinder. This condenser has two barometric columns, one 16 ins. in diameter for the removal of both air and water, and one 20 ins. for an overflow. Cooling water for the condenser is supplied by a 20-in. centrifugal pump driven by a Ball engine.

These four engines are also arranged with 30-in. connections to a 42-in. free exhaust header in the basement of the engine room, a relief valve being placed in each of these connections. This header extends the full length of the basement and connects at each end with a riser leading to an exhaust head above the roof. The part of the header adjacent to the turbines is increased to 54 ins. in diameter. A 12-in. auxiliary exhaust header is also provided for the feed-water heaters, and has a 5-in. riser extending to an exhaust head above the roof. The condenser engines and the feed-water pumps exhaust into the feed-water heaters, and the stoker engines exhaust under the grates.

The noteworthy feature of the whole station is the fact that the two turbines having a combined normal rated capacity of 10,000 kw occupy the space originally provided for one 3500-kw reciprocating unit, although the turbine auxiliaries are somewhat crowded in the basement. The two turbine units are of the five-stage Curtis type, mounted on a base condenser; each of them is direct coupled to a six-pole, delta-connected, three-phase, 35-cycle, 13,200-volt, alternating-current General Electric generator producing 5000 kw at 700 r. p. m. The steam consumption of these units, with steam at 175 lbs., 2 ins. absolute back pressure and 100 degs. F. of superheat, is guaranteed to be 18.3 lbs. per kw-hour at half load; 17 lbs. at full load; 17.5 lbs. at 50 per cent overload and 17.8 lbs. when the load varies between 50 per cent and 150 per cent of the full load. Each unit is controlled by a centrifugal governor, which mechanically operates a poppet type valve in the steam supply line, the variation in speed from no load to full load being guaranteed not to exceed 2 per cent, except that a sudden change in load may cause 4 per cent momentary variation.



GENERAL PLAN OF THE TWIN CITY RAPID TRANSIT COMPANY'S POWER STATION

Street Ry. Journal

The step bearing of the turbine is supplied with 12 gals. of oil a minute under a pressure of 550 lbs. per square inch. The piping system which supplies oil to these bearings is furnished with pressure by two twin Worthington steam pumps, which are connected in relay so in case one pump fails to maintain the required pressure the second will start. A hydraulic accumulator built by R. D. Wood & Company is connected with this piping system to maintain the pressure on the latter. This accumulator has an 8-in. ram with an 8-ft. stroke, and is weighted to produce a working pressure of 550 lbs. A motor-driven triplex pump is also provided as an auxiliary to the steam pumps, and is started automatically if the accumulator falls below the predetermined height. A separate pump and system of piping supplies oil at 80 lbs. pressure for the governors, steady bearings and general lubrication of the turbines. The discharge from the step bearings and governors flows into closed settling tanks, the pumps drawing from these tanks. The water, sediment and dirty oil are drawn from the bottom of the tanks and passed through two Turner filters.

The base condenser of each turbine has 20,000 sq. ft. of surface in brass tubes having an outside diameter of 1 in. The cooling water for each condenser is drawn from the injection tunnel under the basement floor by a 30-in. special volute centrifugal pump with an enclosed impeller. The maximum amount of water required is 18,000 gals. a minute. A vertical 20-in. x 24-in. dry vacuum pump, fitted with a Cincinnati air valve gear controlling the three constant points in the compression cycle, namely, the opening of the suction, the closing of the suction and the closing of the discharge, is provided for each unit. This pump and the centrifugal pump for circulating cooling water are direct connected to a four-valve, 19 in. x 24-in. horizontal Corliss engine. A 4-in., two-stage horizontal turbine pump direct connected by a flexible coupling to a 20-hp, 550-volt, direct-current motor is provided for lifting condensed steam from the bottom of the condenser to the feed-water heater.

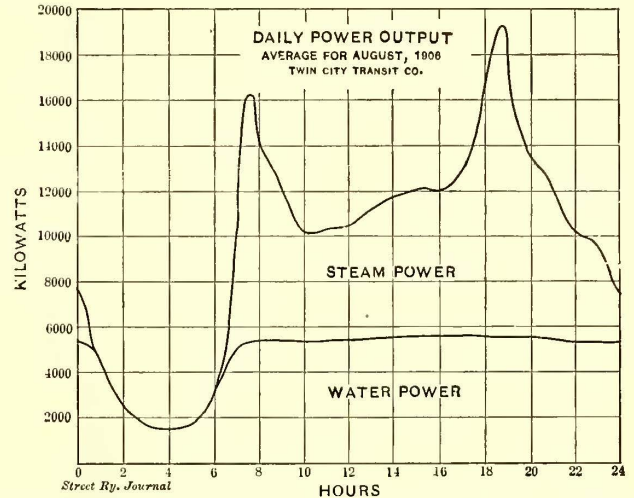
One engine-driven and two motor-driven exciter sets are installed in the engine room. The engine-driven set has a 50-kw, six-pole, shunt-wound, direct-current generator coupled to a 11-in. x 11-in. vertical, single-cylinder engine having a piston valve and automatic fly-wheel governor. The motor-driven sets each have a 200-kw, eight-pole, shunt-wound, direct-current generator direct connected to a 300-hp induction motor, the sets operating at 520 r. p. m.

The switchboard from which the operation of the equipment of the engine room is controlled is on a gallery 31.5 ft. above the floor at the end of the room farthest from the turbine units. This switchboard has twenty-nine panels of blue Vermont marble, all of the instruments having a marine finish. The arrangement of this switchboard will not be described in detail here. The general system of high-tension connections; however, is as follows: The 13,200-volt current from the generators is conveyed by three-phase cables to the generator oil switch, to disconnecting oil switches and to bus-bars. The latter are divided into three sections by means of oil switches. All incoming and outgoing lines are three-phase cables. Current to outgoing lines is conveyed from the bus-bars through disconnecting switches, an oil switch and disconnecting switches, in order. In case two or three cables supply a sub-station, they are connected on different sections of the bus-bars. Static arresters are installed on outgoing and incoming lines to relieve any heavy electrical strains. The grounding of any cable is shown by a Westinghouse static detector. Any

piece of high-tension apparatus can be disconnected in order to make repairs or for inspection and cleaning.

The engine room is served by an electrically-driven traveling crane having a span of 65 ft., a 40-ton main hoist and a 5-ton auxiliary hoist. This crane has a vertical lift of 60 ft., and was built by the Whiting Foundry Equipment Company.

The steam power plant was designed and built and is operated under the direction of E. H. Scofield, chief engi-



TWIN CITY DAILY STEAM AND WATER-POWER CURVES

neer of the Twin City Rapid Transit Company, of Minneapolis. Sargent & Lundy, electrical and mechanical engineers, of Chicago, were consulting engineers to that company during the preparation of the plans and the construction of the station.

AN ACCIDENT FAKIR TRAPPED BY THE UNITED RAILWAYS & ELECTRIC COMPANY OF BALTIMORE

The case of John D. Robinson, who sued the United Railways & Electric Company, of Baltimore, for injuries alleged to have been received while a passenger on one of the company's cars, clearly demonstrates what may be accomplished by the co-operation of steam railroads, street railways and casualty insurance companies in following up and vigorously prosecuting people who take out policies of insurance with a double-indemnity clause and get into an alleged accident on a street car. Not only will they collect from the insurance companies, but they also try to collect from the railway companies as well, and use the money obtained from the one to fight the other. Robinson had been suffering from a hernia for several years, yet he testified on the witness stand that he was a well man before the accident, and that the hernia was a direct result of the accident. His claim against the company was refused and he immediately filed suit. In the trial of his suit, the jury rendered a verdict in favor of the defendant, and Robinson was immediately indicted for perjury. He pleaded guilty and was sentenced to one year in the Maryland Penitentiary. The railway company and the police authorities were enabled to bring Robinson to justice by the assistance of the Alliance Against Accident Frauds. Prior to the indictment of Robinson it was a common thing for men who had been in a street railway accident in Baltimore to claim that a hernia followed as a direct result of the accident, but since the indictment of Robinson this kind of claims against the company has been practically eliminated.

general charge of the legal work of the company. The general solicitor, who reports to the general counsel, has special charge of litigation in connection with claims, and consequently is legal adviser to the claim department. The assistant counsel has charge of such other legal work of the company as may be assigned to him by the general counsel.

The office of secretary of the company is filled by Frederick Evans, who, in addition to this office, is also secretary of all of the various committees of the company. Mr. Evans also has charge of the general correspondence of the company and its relations with the press, and interviews, as a rule, are given out through him.

The treasurer, J. P. Dusenberry, is custodian of the company's funds and in charge of all receipts and disbursements. The paymaster, cashier and assistant treasurer report to him. It is the policy of the company to pay its employees weekly in cash so far as possible, and this work devolves upon the paymaster, so far as the railway employees are concerned. Owing, however, to the extent of territory served by the company, it has been found impracticable to extend this service to employees stationed at some distance from the railway lines of the company. In consequence, the employees of the gas and electrical departments are paid through the local cashiers of the various divisions. The railway employees are paid from a pay-car, which is assigned to a separate division each day. The employees of the gas and electrical departments are paid semi-monthly. The office of comptroller is occupied by P. S. Young. The accounting of the company is divided into three departments, each department being in charge of a general auditor, as shown in the chart; and each auditor reports to the comptroller.

The gas and electric commercial offices of the company are situated in the localities served and are divided into divisions with district sub-divisions. Each division is in charge of a general agent, to whom the district agents report. These local offices deal directly with the consumer, solicit business and collect bills. The general auditor of the electrical department is E. J. Allegaert, of the gas department W. H. Pettes, and of the railway department M. R. Boylan.

The purchasing agent of the company is J. A. Pearson, of Philadelphia, who is also purchasing agent of the United Gas Improvement Company, of Philadelphia, and who has his office at the corner of Broad and Arch Streets, in that city. Mr. Pearson, however, also has an office in Newark, where he is represented by an assistant purchasing agent. The purchasing department, of course, confers with the general managers of the departments in regard to purchases of materials and supplies for their departments. Large orders, such as for cars, rail, coal, etc., are approved by the executive committee before the transaction is completed.

The operation of the system of the Public Service Corporation is divided into three departments, each in charge of a general manager. The general manager of the gas department is H. D. Whitcomb, Jr., with his engineers of divisions, works superintendents and distribution superintendents. The electrical department is in charge of Dudley Farrand, who, in addition to the duties pertaining to the production and distribution of current for lighting purposes, also has charge of the production of electric power for the railway system. This includes the construction and maintenance of all of the power plants. The responsibility of the electrical department in the supply of current

for railway purposes ceases at the bus-bars of the production stations, but for lighting purposes it includes the delivery of the current to the consumer.

The railway department is under the management of Richard E. Danforth, who recently succeeded Albert H. Stanley in that position. In addition to the operation of cars, this department also has charge of the construction and maintenance of the railway track and overhead lines and the construction and maintenance of the power distribution system after the current leaves the bus-bars of the power station. The railway department is divided into subdivisions, in charge, respectively, of the superintendent of maintenance of way, superintendent of transportation, superintendent of rolling equipment and the superintendent of overhead lines. For ease in operation, the department is further divided into districts, each in charge of a district superintendent, and these districts into divisions, each in charge of a division superintendent.

In addition to the officers already mentioned, the gas and electric departments each has its own commercial agent. These agents are engaged in the promotion and the solicitation of business in their departments. Percy Ingalls has charge of this work for the electrical department and W. H. Allen for the gas department.

The main offices of the company are in the Prudential Building, Newark.

TEST ON 5500-KW TURBINE

The result of some tests on one of the 5500-kw turbo generators in the power station of the Interborough Rapid Transit Company was given in a recent issue of the "Electric Journal." At 28 ins. vacuum there was a consumption of dry steam per kw-hour of 22.44 lbs. at 2000 hp; 20.05 lbs. at 3000 hp; 18.87 lbs. at 4000 hp; 18.18 lbs. at 5000 hp; 17.70 lbs. at 6000 hp; 17.27 lbs. at 7000 hp, and 17.14 lbs. at 8000 hp. Tests were also conducted with 27-in., 26-in., and 25-in. vacuum. The rate of change per inch of vacuum between 26 in. and 28 in., referred to 30 ins., was about 5 per cent of the average corresponding water rate. With lower vacuum the percentage changed to about 3.5 per cent per inch of vacuum. The tests were conducted with saturated steam containing as high as 2.5 per cent moisture. Had superheated steam been used it is probable that the full-load steam consumption would have been approximately 11 lbs. per brake hp-hour with 100 degs. superheat. Comparing this with the economy of a large Corliss engine with an assumed mechanical efficiency of 91 per cent, the engine would have to show an equivalent water rate of close to 10 lbs per ihp per hour to equal the performance of this turbine.

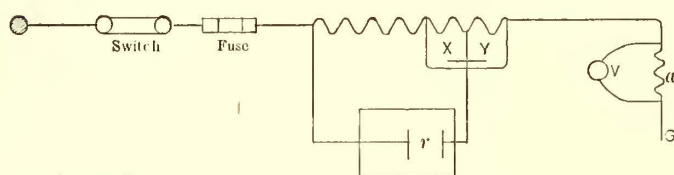
PROPOSED ELECTRIC ORE-CARRYING LINE IN GERMANY

It is reported that the Prussian Government railway authorities have decided to build an electric railway from the Essen coal and iron district, across the semi-mountainous Eifel region to the Saar and Lorraine districts. One of the great electrical companies of Berlin will equip the road. The object is to secure the cheapest transportation for low-grade iron ore from Lorraine to the furnaces of the lower Rhine, while Lorraine draws vast quantities of coal and coke from Essen. Streams in the Eifel range will generate the electricity.

FLEXIBILITY OF WATER AS A VARIABLE RESISTANCE

Some time ago a railway repair shop electrician was requested by his superintendent to go down to a prominent vaudeville theater and "fix 'em up," meaning, in substance, that there was to be put on an electrical production that called for facilities not at hand. The proposition was as follows: An electricity performer needed 125 amps. of current at 110 volts; his lamps would not operate satisfactorily with alternating current, so he must have direct current; the only direct-current source available was the 475-525-volt street railway circuit. It was necessary, then, to use a resistance that would safely carry 125 amps. and leave a voltage not exceeding 110 volts available to the performer. The figures were something like this: 110 volts on the stage means that a resistance in the cellar must divert $500-110 = 390$ volts; we must have a resistance that will consume 390 volts at 125 amps; such a resistance would be $390 \div 110 = 3.54$ ohms, with some way to handle variations. The electrician decided on what he would use. The stage manager somehow learned that a water rheostat figured in the proposed arrangement, and he almost had a fit, because, as he said, the last time a water box was used "it foamed clean to the roof and the lamps acted as if they were on a jigger." As there was lots of time, however, he agreed to a demonstration.

The arrangement used was as indicated in the diagram,



Street Ry. Journal

ARRANGEMENT DEvised TO SECURE 110 VOLTS ON A 475-525-VOLT CIRCUIT

where R is a series of General Electric starting coil grids capable of carrying a current of 100 amps. for thirty minutes without undue heating and measuring $390 \div 100 = 3.9$ ohms. In parallel with this battery of grids was connected a water box r , proven, by experiment, able to carry a current of 50 amps. without foaming and giving a convenient resistance variation that would hold the current anywhere between the limits of 10 amps. and 50 amps. As the resistance of the performer's end of the circuit would be $110 \div 125 = 0.88$ ohm, an experimental resistance of this value was connected at a to correspond to the performer's load. A voltmeter V was connected across a . To allow for emergencies, which did not occur, an extra frame of twenty grids was connected in series with R and a circuit-breaker X connected in parallel with it and closed; another circuit-breaker Y was connected in parallel with the last frame of the regular series R and left open.

The regulation was effected as follows: First resistance R was thrown in circuit, giving, on junction with the experimental load a , a current of about 100 amps. The water box circuit was closed then and its resistance varied until the voltmeter across the experimental load indicated 110 volts. By regulation of the water resistance the voltmeter needle could be kept constant at any value from 100 to 120. The object of circuit-breakers X and Y was to give a greater variation in event of great line variation or of one of the performer's lamp circuits failing. Kicking X open would increase R 's resistance twenty grids, and closing Y would

decrease it twenty grids. It was not necessary to use either of the breakers. The performer's electrician tried the arrangement and pronounced it entirely satisfactory.

It is sometimes a serious problem as to how to vary heavy currents gradually, especially when the currents must be maintained for any length of time. The writer has tried several methods and has found that unless there are facilities for varying the voltage of the supply current a water box in parallel with a constant resistance is the most satisfactory arrangement. He has used it for regulating currents between the limits of 400 amps. and 700 amps.

THE DEFORMATION OF RAILS AND WHEELS

In the July 13 issue of this paper an abstract was published of the paper presented by H. R. A. Mallock on the action of wheels on rails in electric roads at the engineering conference, held in London last month under the auspices of the Institution of Civil Engineers.

The discussion on this subject according to "Engineering," was opened by F. E. Robertson, C. I. E., who said that the real cause of excessive wear at the present day was to be found in the increase of wheel loads and decrease of diameter of the wheel. The safe load was a function of the diameter of the wheel. In dealing with complaints made lately by Indian railways that their new rails wore less well than the old, he had asked for samples of both kinds. Twelve samples from new rails and twelve samples from old rails had been tested analytically, mechanically, and microscopically, and it was proved that there was really no difference between the groups of old and new. The real trouble lay with the new classes of locomotives that had been introduced. He thought Mr. Mallock would have been nearer the mark had he taken 8 tons as the wheel-load at the present day, instead of 4 tons.

The next speaker was A. W. Szlumper, who stated that the wear of rails in tube railways was not phenomenal on the straight portions of the line, and was so only on the outer and raised rails on curves. In corroboration of this assertion he instanced the case of ordinary Bessemer rails on a 1 in 30 incline on the straight that had been laid now for nine years on a line with 5-minute traffic, and the wear was only $1/16$ of an inch. But on the high rail on curves at switches and crossings they had much trouble. The question of wear of wheels was, however, equally important. In order to reduce these troubles they had put in guard-rails, had carefully adjusted the gage, and had taken the precaution of greasing the guard-rails twice a week. The life of rails had by this means been increased by sixteen to twenty or more months. The introduction of hard rails would, he considered, merely transfer the wear from the rail to the wheel. With regard to Mr. Mallock's figures, he thought the area of contact calculated too small, and he believed that only elastic deformation was caused. Mr. Mallock suggested that the worst effect would be realized when wheels and rails were new, as then the area of contact was smallest. His (Mr. Szlumper's) experience showed that wear was very little at first, and much greater subsequently, when the wheel and rail have assumed approximately the corresponding shapes.

Prof. Carus Wilson stated that he had made experiments which gave results analogous to those that might be expected from Mr. Mallock's figures. With a 40-in. wheel, and a load of 3.2 tons per inch run, he found that the stress

in the top fiber of the rail amounted to 18 tons per square inch. In his view, the tendency of the rail to tear apart was more serious than the question of wear. The greatest strain when a wheel passed over a rail was not, he said, at the bottom or lowest fiber of the span, where it would be expected, but at the top, produced by this local action of the wheel. In the upper fiber there was direct tension, as the result of the load, and this gradually diminished towards the middle of the cross-section. Professor Wilson continued that if corrugated rails were examined, microscopic cracks would be found extending from the top downwards, corresponding with the effect he would expect from heavy wheel-loads. Corrugations tended to reduce the area of contact to a small fraction of an inch, and therefore the cracks appeared.

Prof. B. Hopkinson considered that the time-factor should not be omitted in such calculations. In some tests on wire that he had made, a load of 500 lbs. had produced permanent deformation, but if the load was applied for only 1/1000 of a second, an 800-lb. load produced no permanent deformation. In some other tests it was found that a load of 25 tons per square inch might be safely increased to 50 or 60 tons if applied for 1/1000 of a second, it then producing no permanent deformation. If the lesson taught by these laboratory experiments was applicable, it would suggest that wear was less on sections on which fast running was the rule, and greater on slow sections or roads.

R. H. Burnett said that wear might be reduced by paying greater attention to the design and construction of trucks, which were, as a rule, now, of too short a wheel-base.

This point was further commented on by W. H. Short, who said that the side wear of the outer rail produced by the leading outside wheel was, he considered, unavoidable. It was practically independent of the speed, or radius of the curve. If the factor of friction were taken as 0.25, there was, he said, with a truck of 5-ft. wheel base and with correct super-elevation, a force thrusting against the outer rail equivalent to three-quarters of the total load on the wheel. An increase of wheel base to 10 ft. reduced this by 20 per cent. The ill effects increased inversely as the diameter of the wheels, and, again, the rate of wear increased as the wear increased. The service of the guard-rail arose from its sharing with the outer rail this outward thrust.

Prof. W. E. Dalby drew attention to the fact that locomotive tires are often found not to be circular after running some time and have to be trued up. He thought that where stops were frequent and there was much braking, other wheels would also be found to be in this state, which might be the cause of some of the trouble.

Dr. Harbord said that, as a rule, the tire and rail were not of the same quality of steel, as Mr. Mallock had assumed, and that while rails had an elastic limit of about 20 tons, tires had an elastic limit of 26 to 28 tons. With regard to actual wear, he would point out that high-silicon tires (containing 0.3 to 0.35 per cent Si) had been in use for years, and had worn well, as the effect of silicon was to produce a sounder steel.

D. D. Coath said that wear could only be got over by the elimination of friction between the tire and rail; this could be done, he asserted, by putting the flanges on the outside of the wheel-tread in a manner that had been worked out by him, which, however, he was afraid was some 70 years too late.

W. Willox said that he considered ripples of wear of little moment, but waves or corrugations such as he had had ex-

perience of were more important. They were from 9 ins. to 5 ft. and 6 ft. in length, up to 5/16 in. in depth, and might appear in six weeks or only after three or four years, and under all conditions of traffic and location; there appeared to be nothing consistent about them, or the reason for, or manner of, their appearance. Test pieces cut from ridges and from hollows revealed no clue to the problem, which was a most serious one financially, as good rails were often ruined in this way after only a short life.

E. Benedict suggested that the ridges might be found to travel either backwards or forwards, if observations were made to this end. He pointed out that, as a train progressed simply by means of the frictional grip of the driving wheels on the rail, wear must take place, in the case of driving wheels and on the rail. For other wheels the wear on the rail is small, as it is pure rolling friction.

J. W. Twinberrow thought that wear on heavy electric traction roads was mainly due to the fact that designers had followed in the steps of tramways where no need for this existed. A longer truck wheel base would be beneficial. The motor trucks were too weak, consisting, as a rule, of ordinary trucks with bracing removed, and driving gear crowded in instead, and they should be made much more rigid. When the drive was applied close to one wheel, the other, on account of the torque, was out of phase, so to speak, and this produced rhythmic vibration in the shaft, causing unequal wear. Once this had started it increased very rapidly. On the question of brake-work, which usually seemed to be hung on anywhere, he thought that the proper system should be to block both sides of each wheel, or else the insides of the wheels, and not the outsides, as was so commonly done; for in this latter case the spring base was, perhaps, as little as one-half the braking base, whereas they should be at least equal, or the spring base the greater of the two.

R. J. Howley was the next speaker, and said that his experience only enabled him to speak of tramways, but he might say that he had found corrugations on tracks of all kinds, and even on cable tramways, so that this effect was not due to the trucks used in electric traction. It was due to the rolling load, which worked the rail up into lumps. The quality of the rails must be looked to for the cause. In an analysis of "quiet" and "roaring" rails he found that the ratio of carbon to manganese was low in "roaring" rails and high in "quiet" ones. Out of twenty-four samples in which the ratio of carbon to manganese was high, only one rail was a "roaring" rail. When this ratio was 40 to 100 the rails were "roarers"; all above this were "quiet."

The chairman (W. R. Galbraith), in closing the discussion, said that it might be of interest for members to hear a true account of trouble reported on the Waterloo & City Electric Railway. As first laid, this line was tight to gage, and wear on curves was serious; but this had now been rectified, and wear was not abnormal. He also read an extract of a letter from the engineer of that line, in which it was said that when new the rolling stock had had no play at all allowed for the axle boxes in the guides, so that the wheel base was too rigid, and this contributed to excessive wear.

H. R. A. Mallock, in replying, said the time factor should really be included in the calculation, and that the result would be that the load could be materially increased over that on which his calculations were based, and he had only omitted the point to condense the matter into the time allowed.

PASSENGER PLATFORM AT BAY SHORE PARK, BALTIMORE

Bay Shore Park, on Chesapeake Bay, has developed into a very popular recreation ground for the Baltimoreans glad

cars entering the station run alongside a 5-ft. iron picket fence on the outside, which effectually prevents any boarding of cars from that side. The passenger platform is divided in two sections—one for unloading and the other for loading. They are 12 ft. wide and taken together 208 ft. long.

The platforms are separated by a picket fence which has a locked sliding gate that can be opened only by employees. In addition to this fence, it will be noted that a moat has been built between and alongside the track at the dividing-line, and similar moats at the points where the tracks enter and leave. Although these moats contain only 18 ins. of water, their width of 6 ft. is great enough to discourage those who would take an unfair advantage in getting on the cars.

Passengers on leaving the cars proceed directly to the park grounds by passing through the turnstiles, as no other exit is possible, unless the attendant find it necessary to operate the sliding gate.

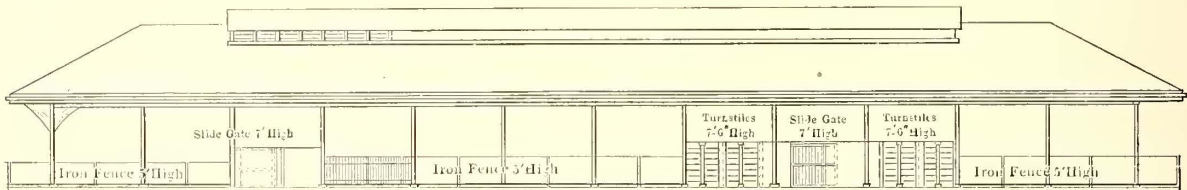
The entrance to the loading platform is controlled by a sliding gate which can be closed by the attendant when the platform becomes too crowded. At present 1000 passengers an hour can be handled with cars running on the 3-minute maximum headway with 50 passengers to the car. As the trip to the

center of Baltimore takes 1 hour, practically all of the passengers wait for seats. The capacity of the platform is



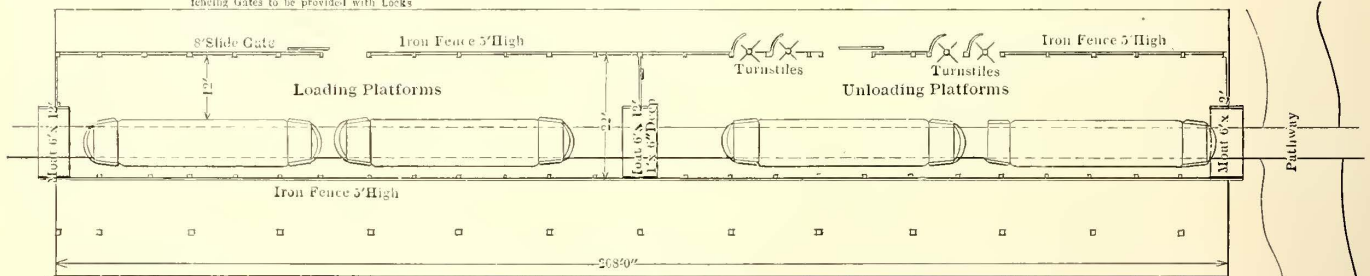
ENTRANCE TO THE BAY SHORE PARK TERMINAL, SHOWING ONE OF THE MOATS

of the opportunity to see salt water. The park is owned and operated by the United Railways & Electric Company,



Note: Gates to be made of same material as fence and to be covered with 1/2" mesh wire fencing. Gates to be provided with Locks.

ELEVATION



PLAN

PLAN AND ELEVATION OF THE BAY SHORE PARK TERMINAL OF THE UNITED RAILWAYS & ELECTRIC COMPANY

and much of its success is due to the comfortable cars and fast schedules maintained for this resort. The Bay Shore line is double track, and a great portion of it is on right of way. At a short distance from the park, however, the incoming and outgoing tracks diverge so that a single-track loop is formed at the terminal. To improve the car facilities at the park and avoid troubles due to opposing lines of traffic, a platform was constructed which is of somewhat unusual type but answers the purpose very well.

As shown in the accompanying plan and elevation, the

considerably greater than the figure given would indicate, but is limited by conditions that make a shorter headway impracticable at the present time.

Under an agreement reached with the Philadelphia Rapid Transit Company, the Lehigh Valley Traction Company will be able to run its cars into the Philadelphia company's station at Chestnut Hill instead of stopping in the open at the Wheel Pump Hotel.

MUNICIPAL OWNERSHIP OF GAS AND ELECTRIC LIGHTING PROPERTIES

The reviews of the effect of municipal ownership upon public utilities by members of the National Civic Federation are being completed. Those on gas and electric lighting are abstracted below. One of these reports was submitted by Milo R. Maltbie, one of the Public Utility Commissioners for New York City, recently appointed by Governor Hughes. The other is a joint report of Charles L. Edgar, president of the Edison Electric Illuminating Company, of Boston, and Walton Clark, vice-president of the United Gas Improvement Company, of Philadelphia.

MR. MALTBIE'S REVIEW

The gas plants examined by the investigating committee of the Commission were those conducted by the municipalities of Birmingham, Glasgow, Manchester and Leicester, and by private companies at Sheffield, the Newcastle & Gateshead Company, and the South Metropolitan Company, of London. On the important subject of maintenance of plants, etc., Mr. Maltbie says that during last year every municipality set aside out of earnings a larger total to maintain or extend the plant or wipe out indebtedness than did any private company. As to the price of gas to the customer, Mr. Maltbie points out that the private company at Sheffield is able to buy good gas and coke-making coal at a lower price than any other company or municipality and finds a market for its coke at its very door in which it receives more per ton than any other undertaking save one; and that it sold its by-products for more than the cost of its coal, oil and other supplies, making profit thereon of 2.13d. per thousand cubic ft. of gas sold. No other undertaking was so fortunate, and a comparison as regards prices and costs between Sheffield and any other plant not so well situated would be misleading and unfair. If it should be assumed that the residuals paid the cost of gas materials in every plant, and if the charges for maintenance, rates and taxes, contributions to the public funds, should be equalized, the average price at which gas could have been sold by the municipal plants would have been 16.84d. per 1000 ft. and the private companies 21.31d. In operating expenses there is not much difference between the municipal and private plants, the difference in expenses being confined to interest, dividends and credit balance.

All of the undertakings examined, according to Mr. Maltbie, have a good record in character of service, and barring the few accidents which happen in all plants, gas has been continuously furnished, both by the companies and the cities. He finds, however, that the municipalities are better prepared to furnish an uninterrupted supply during a strike than the private companies. The quality of the gas itself Mr. Maltbie finds to be superior in the municipal plants, according to the official reports. The charge was made, however, that the tests were not fair, in that the municipalities tested their own gas, while that of the companies was tested by an official examiner not connected with the companies. Mr. Maltbie declares, however, that so far as the independence and reliability and accuracy of the persons making the tests of candle-power are concerned, there is no difference between the companies and the municipalities, except possibly Leicester, and there the allowance would be very small.

The municipal plants Mr. Maltbie found to be conducted with greater efficiency than the private undertakings. Thus, in the municipal gas plants, the loss due to leakage and gas used at work was 6.95 per cent of the gas made and the

companies 8.17 per cent. The amount per mile of mains was 359,000 cubic ft. for all municipalities and 489,000 cubic ft. for all companies, a still greater difference, which is due again to the larger number of miles of mains which the municipalities have.

Discussing progress and the introduction of new inventions, Mr. Maltbie's view is that the municipal plants are as modern, as efficient, and as fully up-to-date as the company undertakings. He also gives it as his opinion that the encouragement given to the production of new inventions and the discovery of new processes by a probable demand for them, is certainly as great under municipal operation as under private management.

The electric lighting plants investigated by the Civic Federation Commission were the municipal ones at Manchester, Liverpool, Glasgow, and the borough of St. Pancras, London, and those operated by the Newcastle Supply Company, the Newcastle District Company and the four London companies: the City of London, Westminster, St. James and Central. Charges by the municipal plants were more economical, according to Mr. Maltbie, the cities charging .529d. per unit less than charged by the private companies. As to efficiency of service, there was no difference between the municipal and the company undertakings, as regards the promptness with which current was turned on and complaints attended to, the convenience of the location of offices; the testing of meters, the restoration of paving after streets were opened, the care given to street work generally, although there were more complaints upon this score against companies than municipalities, the construction of extensions, and the extent to which the entire area of supply was served and appliances carried in stock for sale or rent.

The character and equipment of the plants investigated are discussed. Mr. Maltbie summarizes the result of this branch of the examination, saying it appears that one of the company stations is more modern and efficient than any one maintained by a municipality; but it is also true that two of the companies are more backward and have a more antiquated equipment than any municipality. Upon the whole, the municipal undertakings seem to be as modern as those belonging to the companies, but not so well located or arranged, and perhaps not quite as efficient.

In concluding his review of the reports of the experts Mr. Maltbie says:

"The opponents of municipal activity have frequently tried to scare the British voter and to prejudice him against the operation of public utilities by local authorities by citing the large increase in total indebtedness within the last fifty years, as compared with the decrease of the national debt. They have pointed out that the local debt has more than trebled in the twenty-five years from 1875 to 1900, and that the amount of local debt per £100 of ratable value of property has doubled in the same period, while the national debt has decreased almost 18 per cent.

"Over 40 per cent of the local debt is for water, gas and electricity works, tramways, markets, harbor improvements, wharves, cemeteries, baths, workmen's dwellings, etc. In every one of these cases the debt is represented by physical assets. It has also been definitely shown not only that the debt is not a burden upon the taxpayer, but that the taxpayer gets a financial benefit from municipal operation, and therefore from the very debt which is claimed to be a burden upon him. It is not evidence, but it is suggestive, that the local tax rates were lower for every group of towns when there was municipal operation of gas, electricity or trams than where companies were operating."

REVIEW BY MR. EDGAR AND MR. CLARK

Mr. Edgar and Mr. Clark open their comments on the British gas situation by pointing out that the private companies supply gas at lower prices than do the municipalities. Thus, the relatively small cities of Newcastle and Sheffield get cheaper gas from private companies than do the larger cities of Manchester, Birmingham or Glasgow. The difference in cost per ton of coal does not explain this difference in the selling price of gas, according to the reviewers, who find that the greater efficiency in management and in energy in selling the by-products has much to do with the lower prices. The service given the consumer by the private companies is declared to be superior to that given by the cities, although it is pointed out that the investigation of the candle-power of the light supplied was incomplete in the municipal plants because of the declaration of the authorities to permit the experts to make full examination.

"The whole question of the quality of the product of the municipalities is in doubt," say the reviewers. "The members of the Commission and the experts who are familiar with gas and photometry see no escape from the conclusion that the above facts show that the service of the municipalities is not what it is claimed, that the municipalities are unwilling to have the actual quality of their service determined by independent and competent authorities, and that the gas supplied by private companies is much superior in candle-power to that supplied by municipalities."

Considering the general gas service, from a financial standpoint and with a view also to the character of service given and the maintenance of plants, Mr. Edgar and Mr. Clark declare in favor of the private companies. They find that apparently the citizens of municipalities operating gas plants are not seriously concerned with the operation; do not regard the operation of the gas plant as a matter of general interest, and do not take that interest in it which is advanced as one of the arguments in favor of municipal ownership and operation. The lack of interest in municipal plants indicates a general indifference on the part of the public to a condition that they tolerate because they know not how to remedy.

"On a superficial view," continue the reviewers, "the fact that municipal undertakings contribute some of their earnings to the city treasury, and thus aid in reducing the tax rate, seems an advantage gained by that method of operation. Leaving aside the question of injustice involved by a system of relieving the taxpayer at the expense of the gas consumer, let us examine, in the municipal plants investigated, what would have been the effect if the companies' prices had prevailed.

"Glasgow cannot enter into this comparison, because that city has been, for many years, prohibited by act of Parliament from applying any of the profits from its gas undertaking to the common good. London is omitted because of its widely different conditions.

"In the year covered by this investigation, if, in the city of Birmingham, the Newcastle price of gas had prevailed, the consumers would have been £262,600 better off; if the Sheffield price had prevailed, the Birmingham gas consumers would have saved £350,900. The amount paid by the Birmingham gas undertaking into the common good was £69,813. So it seems that this city is playing a losing game with its municipal plant; it is mulcting its gas consumers from £250,000 to £350,000 a year in order that it may help out the municipal treasury with a paltry £70,000. In the case of Manchester, if the Newcastle price had pre-

vailed, the gas consumers would have saved £47,500; at Sheffield's price they would have saved £111,300. The amount contributed to the city treasury by the gas business was £60,000. In the case of Leicester, at Newcastle's price, the consumers would have saved £65,200, while if Sheffield's price had obtained they would have saved £90,500. The amount contributed by the gas business to the common good was £43,466."

The examination of the electric lighting systems of Great Britain, both municipal and private, shows, according to Mr. Edgar and Mr. Clark, that municipalities in England, though said to be much better governed than are those in the United States, are by no means as well adapted for commercial operation of an electric lighting plant as are private companies controlled by men of average honesty and ability whose training and initiative are given full scope. "It appears," they add, "that so far as the prices charged are concerned, the system of municipal ownership and operation of electric undertakings in England has given its advocates no reason for feeling ashamed or elated, but that so far as extending the benefits of electric light and power and so far as progressiveness in developing the industry so as to give the best possible service are concerned, it has shown itself to be entirely outclassed by the system of private operation."

MUNICIPAL OWNERSHIP OF STREET RAILWAY PROPERTIES

The reviews of the effect of municipal ownership on street railways for the National Civic Federation municipal ownership committee were prepared by W. J. Clark, of the General Electric Company, and Prof. Frank Parsons, president of the National Public Ownership League. They are published in abstract below:

MR. CLARK'S REPORT

It should be stated for the benefit of general readers that no American street railways were investigated by the Commission, and that the only tramway installations which were directly investigated in the United Kingdom are the following:

Municipally Owned.	Privately Owned.
Manchester.	London United Tramways.
Liverpool.	Dublin United Tramways.
Glasgow.	Norwich Electric Tramways.
London County Council.	

According to the British census of 1901, 69 per cent of the entire population of the United Kingdom was urban in its character. This computation included as urban population the residents in England and Wales in towns of 2000 population or over, and the residents in Ireland and Scotland in towns of 3000 population or over. The total of such urban population was 29,144,726.

According to the United States census of 1900, its urban population was 44.6 per cent of the total inhabitants. This computation included, however, residents in communities of 1000 population or over. The total of such urban population was 33,850,000.

In the comparisons which follow there is a slight advantage in showing in favor of the United Kingdom, because the population in communities of less than 2000 is not included to make up the total urban population as is the case in the figures given for the United States.

The British Parliamentary return on tramways for 1902, and the United States census bulletin on street railways for

the same year (the last official publication covering details of all American street railways), contain figures quoted below, and with the above totals on urban population of the respective countries are the basis for calculation accompanying such figures.

In 1902 the total length of tramway track in the United Kingdom was 2336 miles. In the United States there were 22,328 miles of track. The urban population in the Kingdom was, therefore, 12,476 per mile of track. In the United States it was 1516. Therefore, the urban resident in the United States had comparatively eight and one-half times greater trackage facilities available to him for travel than had a similar resident of the United Kingdom.

The same year there were 7752 cars on British tramway lines, or one for each 3760 of the urban population. It is thus apparent that the urban resident of the United States had comparatively more than six and one-half times the number of cars available for his use than were available to the English urban resident.

A total of 1,394,452,983 passengers were carried in 1902 on the tramways of the United Kingdom. On the street railways of the United States 5,521,509,521 passengers were carried. Of this last, however, 1,062,403,392 were on transfers, or practically 90 per cent of the entire number of passengers carried in the United Kingdom. Thus, American street railways carried free, nearly as many passengers as the entire number carried in the United Kingdom, all of whom that are accounted for paid fares.

We hear a great deal of talk about the overcrowding of cars in American cities. The above figures clearly demonstrate, however, that, on the basis of passengers carried per car per year, the American street railway car averages but slightly more than one-half the passengers carried by the street railway car of the United Kingdom. That is, the American car averages 93,585 passengers per year, as against 182,463 passengers per year carried by the average car of the United Kingdom.

The average number of rides per capita of the urban population in the United Kingdom was 48, as against 161 in the United States, which fact speaks volumes for the appreciation of extended facilities by the public of the United States.

The average receipts per passenger in the United Kingdom was 2.26 cents, as against 3.76 cents in the United States. However, 9.65 passengers rode per car-mile in the United Kingdom, as against 5.2 passengers per car-mile in the United States. These figures show 21.81 cents revenue per car-mile in the United Kingdom, as against 19.55 cents revenue per car-mile in the United States. In other words, the British passenger paid about 60 per cent of the rate of fare paid by the American passenger, but as above stated, his facilities for travel were from 12 per cent to 15 per cent of those enjoyed by the American passenger.

In 1902 there were two cities of over 100,000 population in the United Kingdom without street railways. In the United States there were none.

In the United Kingdom there were seven cities of from 50,000 to 100,000 population without street railways. In the United States there were none.

In the United Kingdom there were thirty-nine cities of from 25,000 to 50,000 population without street railways. In the United States there were none.

In the United Kingdom there were 295 communities of from 8000 to 25,000 population without street railways. In the United States there were twenty-one.

In 1890 the length of tramway line (not track) in the

United Kingdom was 948 miles. In 1902 it was 1484 miles, showing an increase in twelve years of but 536 miles. In 1890 the length of street railway lines in the United States was 5783 miles. In 1902 it was 16,538 miles, showing an increase in the intervening period of 10,755 miles, or an increase nearly twenty times as great as that in the United Kingdom.

The increase in passengers carried between 1890 and 1902 in the United Kingdom was 868,083,655. In the United States the corresponding increase was 3,598,499,318, or, say, four and one-half times greater than that in the United Kingdom, which, of course, is not a growth proportionate to the great increase in facilities afforded in the United States. To put it another way, the passengers carried per mile of line in 1890 in the United Kingdom were 555,232; in 1902, 939,658, showing an increase in the intervening period of 394,426. In 1890, in the United States, 349,838 passengers were carried per mile of line. In 1902, but 333,862, a decrease of 5976.

These figures clearly demonstrate that the British policy has been to electrify and not greatly extend existing tramways, except through densely populated districts, which means obtaining the greatest possible revenue without affording adequate transportation facilities, whereas, in the United States, private enterprise has constructed lines which afford public facilities, but which, in many instances, do not bring an adequate return.

It is well to note in this connection that the policy pursued in the United Kingdom must necessarily result in low rates of fares. If, in such cities as New York, Philadelphia, Chicago and St. Louis, we were to cut down the miles of track to correspond to the conditions prevailing in such cities as London, Glasgow, Manchester and Liverpool, we would find that there would be only about 21 per cent of the present track, and, furthermore, that this comparatively small and inadequate trackage would be, for the most part, confined to the densely populated districts. If a person desired to travel beyond this section it would be necessary for him to walk or use some conveyance other than the electric car.

From 1902 to 1905 the miles of tramway track in the United Kingdom had increased from 2336 to 3376, a total of 1040 miles. In the United States during the same period the increase in miles of street and similar railways was from 22,328 to 33,250, a total increase of 10,922, or over ten times the increase in the United Kingdom.

During the same period the increase in cars in use on British tramways was from 7752 to 10,344, a total increase of 2592. In the United States the increase was from 59,000 cars in 1902, to 79,751 in 1905, a total increase of 20,751, or between seven and eight times as great as in the United Kingdom.

Some comparison of facilities available in cities of comparatively the same size in the two countries may be desirable. Hence the following comparison of miles of street railway track in certain cities. The figures for the United Kingdom are for 1905. Those for the United States are for 1902. (Figures on track from Parliamentary return. On population from tables of "London Electrician.")

For the United States the figures given cover only the actual trackage within the incorporated limits of the respective municipalities, and do not include the extensive suburban and interurban track connected therewith. If we consider the twenty largest cities in the two countries we find the following most interesting facts:

The combined population of the twenty American cities

is 12,854,897, as against 14,771,518 for those of the United Kingdom.

The combined miles of track for the twenty American cities is 5966, as against 1567 for those of the United Kingdom.

The average population per mile of track for the twenty American cities is 2155, as against 9426 for those of the United Kingdom.

UNITED KINGDOM

British Street Railways—1906

Cities	Population Served	Miles of Track	Populat'n per Mile of Track
Greater London	6,581,000	274.68	23,958
Glasgow	1,000,000	147.62	6,779
Manchester	850,000	146.19	5,130
Liverpool	798,000	104.00	7,663
Birmingham	650,000	44.5	14,606
Leeds	450,142	89.07	6,765
Sheffield	432,940	65.83	6,577
Potteries district	400,000	38.43	10,409
Dublin and district.....	393,994	107.5	3,685
Belfast	358,680	73.14	4,767
Bristol	358,000	52.00	6,885
Edinburg	331,997	43.00	7,720
Bradford	324,000	96.69	3,351
West Ham	300,000	17.03	17,616
Salford	300,000	70.75	4,242
Newcastle-on-Tyne	300,000	49.85	6,017
Hull	253,865	27.19	9,368
Nottingham	239,800	30.12	7,961
Leicester	228,100	37.00	6,165
Belton	221,000	42.2	5,237

UNITED STATES

American Street Railways—1902

Cities	Population Served	Miles of Track	Populat'n per Mile of Track
New York	3,716,169	1,349	2,754
Chicago	1,873,820	925	2,026
Philadelphia	1,367,716	540	2,533
St. Louis	612,279	345	1,775
Boston	594,618	253	2,073
Baltimore	531,313	228	2,330
Cleveland	414,950	182	2,280
Buffalo	381,403	198	1,926
San Francisco	355,919	283	1,257
Pittsburg	345,045	176	1,960
Cincinnati	332,934	197	1,690
Milwaukee	313,025	117	2,675
Detroit	309,619	*316	979
New Orleans	300,625	176	*1,708
Washington	293,217	150	1,955
Newark, N. J.....	265,394	94	2,632
Jersey City	219,462	60	3,658
Louisville	215,722	125	1,726
Minneapolis	214,112	128	1,673
Indianapolis	197,555	124	1,593
Providence	186,742	80	2,334
Kansas City	173,064	133	1,301
St. Paul	172,038	105	1,638

* There is probably some error in this census figure.

The above thoroughly demonstrates that the primary object for which local transportation lines are created, to wit, giving best of public facilities, has been far better attained in the United States than in the United Kingdom.

Another point of great advantage in American street railways as against those operated in the United Kingdom is that the former are, on the average, operated 18 hours per day, while those of the latter do not average more than 15 hours operation each day. Then, too, in the larger American cities there is an all-night service, while such is not the case in the cities of the United Kingdom.

It is true that the development of electric traction enterprises by British municipalities did not commence until a much later date than in the United States; in fact no moves were made in this direction until its great success had been thoroughly demonstrated in America, on the Continent, and even in the United Kingdom itself by private enterprise at

Leeds, Dublin, and elsewhere, and long after private enterprise had expended enormous sums in perfecting its operation, thus obviating the necessity of British municipalities standing any portion of the tremendous development charges of what has been so beneficial to humanity and which has added so materially to the capital charges of traction companies the world over.

This is thoroughly illustrated by the following extract from the report of the Glasgow Commission Tramways after their visit to America the latter part of 1896:

American managers and engineers, while they smile at our still continuing to operate with horses, at the same time congratulate us on our having been able to wait. The pioneers of the electric overhead system have come through a trying and expensive experience. The first motors, generators and equipments were crude and soon had to be thrown aside in favor of newer designs. They also in their turn became obsolete. Even up till within the last two years great improvements were made but now it is generally believed that engines and generators, motors and line equipments have all been by experience so much improved that now they are practically standardized, and they can undoubtedly be bought at very much less money than at any former time.

Consequently with all this past experience of other before them the progress of British municipal officials in tramway development in recent years should have been very rapid, but, as stated, it has not been so.

The taking over of British tramways from their company owners by the municipalities, while in accordance with the tramway act of 1870, under its so-called "Scrap Iron" clause can hardly be designated other than as legalized confiscation. How little these municipalities paid for the properties which they thus acquired, and the losses and pioneer work which went therewith, few realize.

According to the Parliamentary return of April 5, 1906, on tramways and light railways, it appears that in England and Wales there were expended by local authorities on construction or purchase of old lines and works now superseded, but £2,516,148; in Scotland for the same purpose, £130,837; in Ireland, £332,364; total for the Kingdom, £2,979,349, or, say \$14,800,000, covering the most valuable tramway properties in the Kingdom, a less figure than has been paid by present street railway companies in several medium size American cities for the plant and business of the companies which have preceded them.

The strongest arguments ordinarily advanced by the advocates of municipal tramway ownership are the profits which the municipality or public receives from their operation, and there is a mistaken impression prevailing that these are comparatively larger than similar financial benefits which American municipalities derive from street railway companies.

The British Parliamentary return for 1906 on tramways and light railways shows that the total rates and taxes paid by the tramways in the Kingdom were £121,761 for the companies, and £262,527 for the municipalities, a total of £384,288, or, say \$1,900,000.

Differently than is ordinarily supposed, about one-half of this amount goes to the National Government, which levies an income tax of 5 per cent upon the net earnings of the tramways, so that the municipalities receive direct from those sources less than a total of \$1,000,000.

For the sake of comparison it should be said that the street, surface, elevated and underground railroads of New York State in the year ending June 30, 1904, paid in taxes \$3,943,697, and that in 1902 the operating and lessor street railway companies in the United States paid in taxes \$13,366,335. It is now estimated that the total taxes paid by

the street railways of the United States are about \$18,000,000.

It will be rightly argued by the advocates of municipal ownership that the municipalities which own tramways derive financial benefits therefrom, other than the mere receipt of taxes through the payment of the debt incurred for the creation thereof, by sinking fund or otherwise; the sum set aside for depreciation and renewal funds, and actual net profits which are, or should be, applied to the relief of taxation.

To best illustrate what the British municipalities and local governments are receiving from tramway operation, and to compare the same with conditions in the United States, the following tabulation is given:

UNITED KINGDOM.

Estimated total derived from municipal and company tramways by local and municipal government from taxation	£ 200,000
Repayment of debt or sinking fund by municipal tramways	663,336
Reserve including depreciation and renewal funds..	623,617
Relief of rates (local taxation).....	205,981
Other matters including balance carried forward from fiscal year ending March 31, 1906.....	96,587
Total possible financial benefits derived by national and local governments from operation of tramways in the United Kingdom.....	£ 1,789,521
Or say	\$8,679,176

Subsequently the inaccuracy of British municipal tramway accounts will be shown and their tendency to unfairly demonstrate favorable results from operation in such a manner as to thoroughly discredit them and show that the above is far more favorable than actual results secured; but for the purpose of comparison it is necessary to here take the official statements as made in the parliamentary report on tramways and light railways, 1906.

UNITED STATES.

1906.

Estimated taxes paid by operating street railway companies based on 33 1/2 per cent increase in actual amount of \$13,078,899 paid in 1902.....	\$18,310,458
Estimated taxes paid by lessor street railway companies same as actual in 1902.....	287,436
Estimated personal taxes paid by holders of capital stock \$1,844,565,136 (see U. S. Government Statistical Abstract 1906) at one-half of 1 per cent.....	9,222,820
Estimated personal taxes paid by holders of bonds \$1,524,371,926 (see U. S. Government Statistical Abstract 1906) at 1 per cent.....	15,243,719
Total	\$43,054,433

So it is seen at a glance that the State and municipal governments of the United States receive at least \$34,375,257 per annum more from the operation of street railways than do the local and municipal governments of the United Kingdom.

Now to correct some of the inaccuracies of British municipal accounting.

According to the parliamentary report on tramways for 1906 the total paid up capital of municipality owned tramways of the Kingdom was £35,423,947, on which as already credited to public earnings from tramway operations in the foregoing calculation but £800,751 had been allowed for depreciation or slightly less than 1.83 per cent.

Every practical man realizes that at least 5 per cent should be allowed for depreciation, so a proper charge for this on the paid up capital of £35,423,947 would be £1,771,197. Consequently the difference between the actual sum

provided for depreciation, viz., £623,617 and the proper figure just stated amounting to £1,147,580 or \$5,565,963 should be deducted from the \$8,679,176 shown as the returns to the local and municipal governments of the United Kingdom from the tramways, leaving net only \$3,113,213.

This shows that the net return to local public authorities in the United Kingdom is \$925 per mile of track whereas in the United States it averages \$1295.

The difference in favor of the United States on this phase of conditions would naturally be improved if proper additions amounting to many millions were made to the capital account of British municipal tramways. While if the great increase in taxable values and returns therefrom arising from the more general development of street railways in America were taken into account, the financial returns to American State and local governments would be demonstrated as enormous; all of which has resulted without the taxpayers being subjected to any risk whatever.

Advocates of street railway municipalities have little to say on the feature of risk to municipalities and their taxpayers due to embarking in such enterprises, but that serious risks do exist from so doing is illustrated by the list of British municipal tramway undertakings, of which, according to the parliamentary return for 1906 there are 40 out of a total of 175 which show direct loss from operation or an actual deficit when sinking fund payments and reserves for depreciation are considered.

This number would be greatly added to if the accounts of the various municipal undertakings in the United Kingdom were properly kept.

Much credit is taken by the municipalists for the improvement of labor conditions arising from many British tramways coming under municipalistic control.

This subject has been so thoroughly treated in the admirable paper by Professor John R. Commons and Mr. J. W. Sullivan, which will be published as part of the records of this Commission, it is considered unnecessary to dwell on this feature to any great extent other than to say that rates and hours of labor on American street railways have improved comparatively as much from the days of animal traction up to the present as has been the case in Great Britain.

It is also considered well to insert the following comparative table showing rates of wages paid conductors and motormen on certain British tramways and on certain street railways in the State of New York. The figures are from the paper of Messrs. Commons and Sullivan and the New York Railroad Commissioners reports.

SYSTEM.	Conductors		Motormen	
	Rates per Hr.		Rates per Hr.	
	Cts.	Cts.	Cts.	Cts.
Glasgow.....	11.2 to 13.9		11.2 to 13.9	
Manchester.....	11. " 13.5		11.5 " 14.	
Liverpool.....	10. " 12.		12. " 13.	
London County Council.....	11.6 " 15.		11.4 " 15.	
London United.....	9.6 " 12.		12. " 14.4	
Dublin.....	7.2 " 9.84		8.4 " 11.14	
Norwich.....	7.5 " 9.		9. " 10.	
New York City Railway.....	20 cts. to 25 cts.		22.5 cts. to 24 cts.	
International Traction, Buffalo	21 " 25 "		21. " 25 "	
Rochester.....	22 " approx.		22. " approx.	
Syracuse.....	21 " "		21. " "	
United Trac. Albany & Troy	22 " "		22. " "	
Schenectady.....	20 " to 25 cts.		20. " to 25 cts.	

The secretary of the American Street and Interurban Railway Association has furnished the following data which have just been compiled (May, 1907), showing the wages of conductors and motormen in twenty-one of the largest cities in the United States.

AVERAGE WAGES PER HOUR OF CONDUCTORS AND
MOTORMEN

Name of City	Minimum Rate in Cents	Maximum Rate in Cents
New York (average of all roads in city of Greater New York).....	21.4	23.1
Chicago	24	27
Philadelphia	21	21
St. Louis	23	23
Boston	24.2	25.3
Baltimore	18	20
Cleveland	21	24
Buffalo	21	24
San Francisco	31	33
Cincinnati	19	21
Pittsburg	25	27
New Orleans	21	21
Detroit	23	25
Milwaukee	19	23
Washington (average of two city lines).....	21.25	21.25
Newark	19	22
Jersey City	19	22
Louisville	20	22
Minneapolis	21	25
Providence	18.2	22.7
Indianapolis	17	19

The same comparative difference in rates of wages exists for all other classes of street railway labor; so it is seen that American street railways pay practically double the rate for salaries and wages that are paid in the United Kingdom, and this is the most important item of their operating expense.

In the State of New York a decrease of wages to British standard would reduce the operating expenses of local transportation lines about \$14,000,000 per annum, an amount equivalent to about 38 per cent of their gross receipts. As their average receipts per passenger in 1905 were 4.12 cents, it is apparent that if British rates of wages were paid by them they would be as well off if they received an average of only 2.45 cents per passenger, which is only one-fifth of a cent higher than the average paid in the United Kingdom.

The higher rates of taxation in the State of New York and greater costs of essentials to operation make the increase in the costs per passenger far greater than one-fifth of a cent.

To contrast differences in payments for accidents alone.

According to the railroad commissioner's report of New York for 1906, the total gross receipts from passengers on the street, surface, elevated and underground railways of the State were \$77,841,051. Total passenger car miles run were 307,619,065; total damages paid, \$2,920,308. This averages 3.76 per cent on the total gross passenger receipts and 0.948 of a cent per car mile.

According to the British Parliamentary report on tramways and light railways of 1906, the total gross passenger receipts on all tramways in the United Kingdom were £10,248,204 or say \$49,603,789. Total car mileage was 244,149,464. Total compensation for personal injury or accident paid £164,342, or say \$787,058. This averages 1.6 per cent on the total gross passenger receipts and 0.322 of a cent per car mile.

Thus in New York State alone the total amount paid on account of damages was \$2,133,250 greater than by all the tramways of the United Kingdom; while the percentages of same to gross passenger receipts was nearly two and one-half times as great and per car mile nearly three times as great.

If the above calculations were extended to all the street railways of the United States, in accordance with the census figures of 1902, the average receipts per passenger which would leave the street railways in the same financial posi-

tion as now from their operation, would be 2.24 cents, arising from the difference in wages alone, or less than the average rate of fare in the United Kingdom; while, as already stated, the American passenger has facilities for travel available to him many times greater than those existing in the United Kingdom.

The total paid annually by all street railways of the United States for damages now amounts to over \$10,000,000.

Turning more directly to British conditions, few Americans realize the obstacles which tramway companies meet in attempting to obtain franchise rights, or the enormous expense to which such companies are subjected in procuring the same.

In most cases the consent of all local authorities affected by the proposed construction of lines must be had before a hearing will be given by either the Board of Trade or Parliament, and in all cases the consent of at least two-thirds of the local authorities must be had. This power is used by the local authorities to force the companies to make excessive payments for, or assume obligations in connections with public improvements not necessitated by tramway construction. The obtaining of frontage consents and compliance with other features of procedure is exceedingly expensive; while hearings before the Board of Trade or Parliamentary committees are still more so. If perchance the company, after overcoming these handicaps, does secure a franchise, it is but for a brief period of years, scarcely long enough to warrant the heavy expenditures required for modern electric railway construction, especially when it is considered that at the expiration of the franchise the municipality can take it over at scrap value.

Against this, municipalities can with little difficulty, and at comparatively slight expense, obtain their Parliamentary rights to construct and operate tramways in perpetuity with a complete monopoly for all time to come. If a prominent British municipality wishes to secure Parliamentary legislation favorable to its tramways or other public utilities, and if it wishes to oppose any contemplated legislation unfavorable thereto or which would result in the creation of any company undertaking, it has at its command a more powerful political influence than exists in the United States. This through an association of the municipalities comprised of several hundred members which is dominated by the Town Clerks of the respective municipalities who are permanent high salaried officials and who are generally animated by the desire of increasing the importance of their own positions and influence through the municipalization of all public utilities. In every municipality they either are or can easily become the most powerful political factors, especially as regards Parliamentary matters.

Rarely are members of Parliament residents of the localities from which they are elected and which they represent. They need the strongest possible local support to be elected. This naturally centers in the municipal governments of their districts, and the Town Clerks and other permanent municipal salaried officials command this influence far more thoroughly than do the more prominent elective officials of the various municipalities. So when a Town Clerk makes a request of a member of Parliament representing his locality the usual result is not unlike what occurs in America when a political boss makes a similar request of some public official whose election he has made possible. With this combined potent influence at work all over the Kingdom in favor or against a particular Parliamentary measure, the effect can be readily imagined.

British conditions in this respect are not unlike what

would occur in an American State providing the State and local "machines" of all parties were kept constantly united to exert their combined influence on legislation. The manner in which the municipalities are favored over companies in the tramway field are thus self-evident; on legislation, on capital account from the outset, on operating expenses and in reaping benefits in later years from traffic created or built up by the tramways. This fact should never be forgotten in comparing British municipal and company tramway conditions or results.

Owing to the narrow streets in most British cities, the construction of new lines of tramways has, almost without exception, necessitated many street widenings. In this connection, municipally owned tramways have been especially favored, as has already been referred to.

While the members of the Commission were in Great Britain and at previous and subsequent meetings of the City Council of Liverpool, it was made officially apparent that the total cost of street widenings and improvements necessitated by the construction of the municipal tramways there had been slightly over £1,000,000, practically all of which is carried in a general public loan for street improvements.

In the Parliamentary report on tramways of April 6, 1905, the expenditures for this purpose by the Liverpool Tramways is shown to be only £9,857.

At a meeting of the London County Council, held Oct. 16, 1906, the fact was demonstrated that no less than £4,044,844 had been expended by the Council on account of the tramways, of which only £377,260 had been charged to the tramway capital account. The total capital account of the London County Council, according to the Parliamentary return of 1906, is £4,188,095, so it is seen that there had been buried in other accounts expenditures in behalf of the tramways amounting to within about £400,000 of the entire capital tramway account.

At the discussion following this expose, Captain Swinton, a prominent member, brought out the fact that since the Council had entered the tramway field, the expenses of the general office had amounted to about £1,200,000, of which there had been charged to the tramway accounts £8,160, and stated that in his opinion on this feature alone the Council's tramway undertaking owed the people of London at least £500,000. This is a larger sum than has been shown, as the net earnings of the properties even by the juggled accounts of the London County Council. (See "London Times" and other London papers, Oct. 17, 1906.)

Such conditions as those just stated naturally cast suspicion upon every feature of municipal tramway accounting, especially when it is noted from the tramway returns what small charges, if any, have been made by the leading municipalities for these purposes.

For street widenings, etc., Manchester shows, as charged to its tramway capital, but £11,588; Glasgow, nothing; Bradford, £8,827; Derby, nothing; Huddersfield, nothing; Hull, nothing; Leeds, nothing; Nottingham, nothing; Oldham, nothing; Plymouth, nothing; Portsmouth, nothing; Preston, nothing; Southampton, nothing; Southport, £3,327; Wolverhampton, nothing; Belfast, nothing.

The total charges to capital accounts of municipal tramways for this purpose, for the entire Kingdom, as shown by the Parliamentary return of 1906, is but £750,092, or only £5,000 more than Sir J. Clifton Robinson has testified that the London United Electric Tramways Company was alone compelled to pay for similar purposes, to say nothing of the financial obligations which it has assumed as regards paying a large annual charge for wayleaves.

It is almost needless to remark that, if all of the accounts of the municipal tramways of the Kingdom, their operating expenses have been favored as greatly at the expense of general funds, as has been shown to be the practice of the London County Council, then all their boasts of economical operation must disappear and deficits appear in place of apparent profits from operation.

Against such a condition as has been recited, the accounts of all company tramways in the Kingdom, under the law, must be thoroughly audited and proper distribution thereto certified by chartered public accountants.

According to the Parliamentary tramway return of 1906, the total paid-up capital of the municipal tramways was £35,423,947. These had 2499 miles of track open for traffic, which is a capitalization of approximately £4,069 per mile of track.

The paid-up capital of the tramway companies was £22,514,470. Their miles of track were 1084, making £20,493 per mile of track, an unfavorable showing for companies upon its face.

Were municipal capital accounts corrected, however, in accordance with the above, the comparison in this respect would then not be unfavorable to the companies, especially when their serious disadvantages and handicaps are considered. The car-mileage of the municipal tramways was 154,963,781; that of the companies, 89,183,383; car miles per mile of track, municipal, 62,011; company, 82,273. This demonstrates that despite the fact that the municipalities have, with few exceptions, acquired the best properties of the Kingdom, they are giving a service about 25 per cent less frequent than is given by the companies. Or, state it another way, the average headway between cars on the municipal lines on a 24-hour basis is, approximately, 8.1 minutes, while upon those of the company but 6.3 minutes. This, of course, demonstrates that the companies operate a more frequent service at a consequently greater expense to accommodate their patrons than do the municipalities.

The total gross receipts of the municipal tramways were £6,853,486 for the year. The operating expenses, including taxes, but not rental of leased lines, amounted to £4,323,734. The net receipts were £2,529,752.

The percentage of operating expenses to gross receipts was 63.1 per cent. The gross receipts of the companies were £3,789,692. The operating expenses, including taxes, but not rental of leased lines, amounted to £2,512,029. The net earnings were £1,277,663. The percentage of operating expense to gross receipts was 66 per cent.

In view of the manner in which the municipal tramways are favored in their showing on operation by charges to other public accounts, and of the superior service operated by the companies, the latter are to be congratulated upon the showing thus made.

The gross receipts per car-mile on the municipal tramways were 10.62d. or 21.24 cents. The operating expenses were 6.69d. or 13.38 cents.

The gross receipts per car-mile of the company tramways were 10.9d. or 20.18 cents. The operating expenses were 6.73d. or 13.46 cents.

Considering the additional burdens of expense borne by the companies, comparison with the favored accounts of the municipal tramways certainly demonstrates that were actual results from operation shown by the municipalities, the superior management of the companies would be clearly demonstrated.

The average receipts per passenger of the municipal tramways was 2.1 cents, by the tramway companies 2.41 cents,

but as the companies are running an average service nearly one-third more frequent than that of the municipalities, the companies are certainly entitled to this small difference in fare.

Those who advocate municipal ownership and operation of American local transportation lines invariably attempt to beguile their readers on the question of rates of fare charged on British tramways, giving the impression that these are much lower than they actually are. It is true that rates of fare are lower in Great Britain than in this country, but the distances which may be ridden for such fares are also very much shorter, which fact is not generally stated by the advocates of municipal ownership. We, as experts, do not hesitate to say that should the street railways of the United States adopt a graduated fare, there is no question but that their returns from passenger traffic would be larger than at present, for there would then be no free transfers and each passenger would pay proportionately to the distance which he rides, thus enormously increasing the short-haul traffic which every railway man knows is the most profitable.

If due allowance were made for high rates of wages and other essentials to operation in the United States, particularly as regards supplies, taxes, and damage accounts, American graduated fares could easily be made comparable with those prevailing in Great Britain or even lower. In fact where an approach has been made in America toward adopting the graduated-fare principle, to wit, upon interurban electric railway lines, such rates of fare are already comparable with present fares prevailing in the United Kingdom.

Statistics recently (April, 1907), compiled in the office of the American Street and Interurban Railway Association show that for seventy-four interurban railways located in nineteen different States, the following averages prevail:

Population of larger terminal.....	133,900
Population of smaller terminal.....	37,200
Fare in cents per mile (one way).....	1.60
Fare in cents per mile (round trip).....	1.57

When it is considered that these interurban roads, to a great extent, run through sparsely settled districts, often extending several miles between small villages, with little intervening population, the comparison of these rates with those of the densely populated cities of the United Kingdom is certainly decidedly in favor of the American interurban railways. As shown by the schedule of our experts, Messrs. Turner and James, the rate of fare averages over 1 cent per mile upon the combined municipally owned lines of Glasgow, Manchester, Liverpool and London County Council.

In considering this general proposition from the standpoint of public benefit, it must, of course, be admitted that with the graduated fare system the individual pays for what he gets. In other words, a portion of the fare of the passenger who rides a short distance does not go toward paying the expense of those passengers who ride distances so great that the expense of carrying them is larger than the fare they pay; but viewed broadly, and considering benefits to communities as a whole, there is no question whatever, but what the flat fare rate in America has done much more for them than could have been accomplished in any other way, especially for the laboring classes; this through a distribution of the population over greater areas, thus improving sanitation, public health and morals, while enormous financial advantages have accrued to local treasuries because of the great increase in building and of real estate values.

The schedule of the Commissioners' experts, Messrs. Turner and James, contains much information concerning fares charged on the various British systems which they investigated. These are of little value for comparison with each other owing to the widely varying conditions in connection with the various projects. Such for instance, as contrasting Norwich, a small city, with either Glasgow, Manchester, Liverpool or London. Neither can comprehensive comparisons be made between the London United system, whose lines are suburban or interurban in their character, with those of the cities just mentioned.

However, for comparison with American conditions, the following tabulation has been compiled from the figures of Messrs. Turner and James on Glasgow, which has the lowest rates of fare of any municipal tramway in Kingdom:

Rates of Fare in Pence	Maximum Distance in Miles	Passengers Carried	Possible Length of Rides in Miles	Passenger Earnings
½.....	.58	58,540,026	33,953,215	£121,958
1.....	2.3	117,897,292	276,164,001	491,239
1½.....	3.48	13,100,122	45,588,424	81,876
2.....	4.59	3,648,195	16,745,219	30,402
2½.....	5.88	1,024,122	6,021,837	10,667
3.....	6.9	1,235,246	8,553,197	15,441
3½.....	8.11	241,241	1,956,464	3,518
4.....	9.19	81,249	746,678	1,354
Totals		195,767,519	389,700,935	£756,480

Analysis of the foregoing will show that the average possible length of ride available to passengers was 1.93 miles and the average fare to be paid therefore was 0.94 pence and the longest ride available for the equivalent of a five-cent fare (2½d.) is 5.88 miles.

Contrast this with conditions existing on certain American street railway systems. According to the records of the American Street and Interurban Railway Association, May 31, 1907:

Name of System	Longest Ride for 5 Cents Without Changing Cars	Longest Ride Possible for 5 Cents Through
New York City Railway Company.....	12.37	37.2
Philadelphia Rapid Transit Company....	14.24	26.13
Pittsburg Railways Company.....	10.5	14.1
United Railways of San Francisco.....	7.4	13.4
United Railways & Electric Company, Baltimore	10.6	17.3
United Railways Company, St. Louis....	14.49	22.35
Washington Railway & Electric Co.....	6.6	13.5

In conclusion a word will be said regarding claims which are constantly made regarding the superior credit which British municipalities possess over public utility companies.

According to quotations in the London Stock Exchange Daily List of May 16, 1907, the total number of municipal securities there quoted was 169.

Of these, 32 were quoted at par or above; 12 from 95 per cent to 99 per cent; 25 from 90 per cent to 94 per cent; 73 from 85 per cent to 89 per cent; 15 from 80 per cent to 84 per cent; 9 from 75 per cent to 79 per cent; 3 from 70 per cent to 74 per cent.

Under the law all these were issued practically at par, and as the aggregate of the issues is several hundred millions of dollars, it is seen at a glance that an enormous loss has fallen upon British investors because of their investment in municipal securities.

It is also apparent that British municipalities to raise funds in the future must pay a higher rate of interest than in the past.

A surprising revelation in connection with the quotations is that certain of the London County Council securities are selling as low as from 72 per cent to 74 per cent. Certain of Glasgow at from 77 per cent to 79 per cent. Certain of Liverpool at from 76 per cent to 78 per cent. Cer-

tain of Manchester at from 87 per cent to 89 per cent.

Against this Dublin United Tramways Company's common shares were quoted at from 142 per cent and a fraction to 152 per cent. The preferred shares of the same company at from 135 per cent to 145 per cent. London United Tramways Company accumulative preferred stock was quoted at from 77½ per cent to 87½ per cent. The debentures of the same company at from 85 per cent to 89 per cent.

No quotations were made on other tramway securities issued by the companies investigated by the Commission.

PROFESSOR PARSONS' REVIEW

Professor Parsons calls attention to the rapid progress in municipal operation of street railways in Great Britain. From 1894 to 1906 the number of municipal systems rose from 3 to 123. The marked success of municipalization in Leeds and Glasgow, he sets forth, gave the movement irresistible momentum, and in 1906 all the principal cities of the United Kingdom had municipal operation of their tramways except Dublin, Bristol, Norwich and Edinburgh. The principal reasons for the municipalization of British tramways, according to Professor Parsons, have been poor service by the companies; their ill-treatment of employees; their refusal to assent to the adoption of electric traction, extension to suburban districts, and other vital improvements; the constant difficulty experienced by the cities, amounting to practical impossibility of securing a reasonable regard to the public interest, or even the fulfillment of actual contracts; the growing belief on the part of the public that the streets and all monopoly uses of them are public property which should not be handed over to private parties, and the desire that the profits of the undertaking should inure to the benefit of the public. When the Commission was in London a visit was paid to Sir Clifton Robinson, the president of the London United Tramway Company, the largest in Great Britain, Mr. Ingalls, chairman of the Commission, asked: "Why was it the companies did not develop electric traction and give the people a thoroughly good service? We understand that the service under the old companies was very bad; why was it?" Sir Clifton replied: "It was ignorance more than anything else; they put in some nephew or relative or friend of an owner to be manager or director—men who knew nothing of transportation. They paid all their profits in dividends, kept nothing for renewals or reserve, did not think ahead or foresee that the cities might take over the plant; and then when it came near to the end of the twenty-one year terms and there was a prospect that the cities would buy, the companies did not pay any dividends at all in many cases, so that when the term was up almost the whole community was down on the companies, and all the cities had to do was to shake the tree and the rotten fruit fell into their mouths."

The British companies opposed extensions, plastered their cars with unsightly advertisements, and refused to reduce fares, saying they could not afford it. But the municipalities took the lines, adopted electric traction and sent the old horse-car system to the scrap-heap, extended the lines, reduced the advertisements to due subordination, lowered the fares, shortened the hours of labor, and after all, realized not the losses the companies predicted, but comfortable profits for the people. Except in the case of Leeds, the rate of reduction of fares is nine to thirty times as great for the municipal period as for the company period and fifty times as great for the municipal systems as a group as compared with the companies in a group. Next to the wish to obtain

a better service at lower fares, says Professor Parsons, the predominant motive in the municipalization of British tramways has been the desire to improve the conditions of labor. The companies worked the men 11 to 14 hours a day for seven days, while the cities have made the hours of labor from 9 to 10 per day, with one day's rest in seven. Increases in wages were made also, amounting to 50 per cent in Liverpool, from 43 to 63 per cent in Manchester and to 42 per cent in London. Notwithstanding these benefits to labor the reductions in fares were considerable, and the total savings from reduced rates for the twelve years under municipal management at Glasgow are estimated at \$23,000,000, as compared with the old company basis. The benefits to labor under city management at Glasgow are computed at \$515,000. There has also been a rapid extension of the lines into Glasgow's suburbs, 50 miles being the total of new line during the period of city operation. Another very important result of public ownership, Professor Parsons finds, was the rapid substitution of electric system for horse-car lines, and in this connection he points out that in New York City in 1906 there still remained 45 miles of horse-car line.

Transit changes are judged in British cities by the minimum fare, the average fare and the distance given for various fares, especially the average distance for a penny (2 cents) which, the Professor says, is the fare the mass of the people pay. All the cities have a 1 cent fare for short distances, from half to three-quarters of a mile, except Liverpool, but none of the private companies has a lower fare than 2 cents for the ordinary passenger traffic. A comparison of Dublin, private ownership, and Glasgow public ownership, shows, according to Professor Parsons, that the Dublin charges, within the rates on which substantially all the traffic moves, are from 50 to 100 per cent above the Glasgow rates for the same distance. For the municipalities as a group the average distance for 2 cents is about 2.2 miles, against 1.6 miles for the companies as a group. It is found also that the people like the graded plan of charging fares according to the distance traveled. While the Commission was in Manchester, one of its members, discussing the graded fares, said to the chairman of one of Manchester's public service committees: "In my city you can ride 12 miles for 5 cents." "Yes," replied the chairman, "and you can ride 12 yards for it, too." In addition to the regular reductions of fares, the tramway managements are required to run workmen's cars mornings and evenings at rates about half the ordinary allowed by law.

The service is good according to British standards and in some instances is excellent, even according to American standards, says Professor Parsons. The speed of British cars is low as compared with American systems, but the speed limits are fixed by the Board of Trade. The narrow streets, together with British caution and regard for safety make it impossible for the street cars to equal the American speed. Thus the tramway lines, public and private, are not to blame for the fact that they are not allowed to exceed 8 m. p. h. in city streets, or from 12 to 16 miles in country districts. There is no all-night service except on the London County Council (public ownership) system. The average hours of service per day show to the advantage of the city-owned systems, their cars being in operation 20.1 hours per day to 18.5 for the company cars.

In various respects the equipment of the municipal lines is superior to that of the companies. Advertisements are not allowed on the cars in Glasgow or Manchester, for

aesthetic reasons, each city foregoing \$50,000 a year revenue which it could obtain in a lump sum for the advertising privilege. In Dublin, however, the private company's cars are covered with advertisements in giant letters, and the sign giving the destination of the cars is almost completely obscured by these advertising signs.

The cars and plants of all the systems under consideration were found to be adequate, modern and efficient. Repairs are well kept up, the plants are clean and neat, the works are properly ventilated and complaints are properly attended to. The Glasgow cars and buildings (public) are especially attractive.

Analyzing the financial conditions of the public and private traction systems in Great Britain, Professor Parsons declares that the municipal system at Glasgow has about \$4,000,000 more assets than liabilities, but that the London United, a private company, has \$16,580,000 of capitalization and \$5,820,000 of tangible assets. The Dublin United, also a private company, has \$4,500,000 of capital in excess of tangible assets. The three municipalities together have \$2,560,000 more physical assets than liabilities, while the companies have \$15,850,000 more liabilities than assets. In addition to the payment of regular taxes, just as if they were private concerns, the four municipal plants—Glasgow, Manchester, Liverpool and the London County Council—have paid nearly \$4,000,000 in relief of general taxation. The benefits of the profits of the municipal systems are shared by 6,747,994 persons, while the profits of the private companies are divided between stockholders who number less than 8000.

Discussing the political results of municipal ownership in Great Britain, Professor Parsons says:

"There has been an increase of political and social efficiency as well as of economic efficiency. Under the company's regime, democracy was at a discount; popular sovereignty was below par. The people found they could not control their own streets, nor secure fair treatment of labor in public service industries, nor obtain rapid transit and other vital improvements on reasonable terms. The tramway owners, with the power of private monopoly in their hands, overruled the will of the people. The companies behave much better now. Not only has the fear of speedy municipalization in case they did not satisfy the new standards and the educated public sentiment developed by municipal operation made a strong impression on the remaining companies, but they have also been stimulated by municipal example to do their best to rival the advancement made by public managements. They give more consideration to public opinion, and pay more regard to the public interest in the conduct of their business. But the dominance of public interest, so far as it has been secured either in public or private systems, is in large measure the result of the development of municipal operation. For some purposes the power to municipalize is almost as effective as municipalization itself. Under the pressure of new standards and an educated public sentiment developed by municipal operation in the full publicity created by it in respect to all tramway costs and methods, the present companies at their best are managed with so much regard and to the common interest that a casual observation might lead one to think there is nothing to be gained by further municipalization. Yet, the cities and towns continue to municipalize the tramways. They believe that a well managed public tramway is better, from the public standpoint, than even the best private system, for several reasons: (1) It se-

cures to the public the profits taken from the public through their patronage of public-service monopolies operating under franchises granted to the public; (2) it tends to lower fares and widens distribution of the benefits of the service—a public plant is more apt to regard a surplus as a reason for reduction of charges; (3) it aims primarily at service, while a company management must aim at dividends—it is benefit for all versus profit for a few as the fundamental motive and purpose; (4) it gives the municipality direct and complete control of its streets in place of indirect and partial control; (5) it eliminates the opposition of interest between the owners and the public, which may, at any time, give rise to difficulty, dispute and obstruction of the public will and interest; (6) it makes the managers the direct agents and employees of the people instead of the agents of a company employed and paid by private parties to work for the interest and obey the instructions of those parties—a city, as well as an individual, can control its own servants and make them obey its will and wish better than the servants of some other person; (7) it adds a new field for civic activity and the development of civic activity and the development of civic interests and motives and the habits of thought and action on which good citizenship depends."

MORE CABLE CARS FOR EDINBURGH

The tramway committee of the Edinburgh Town Council has decided to recommend the acceptance of the tender of Dick, Kerr & Company, for cabling Broughton Street and Gilmore Place for £37,381. Other extensions aggregating £73,000 are under contemplation.

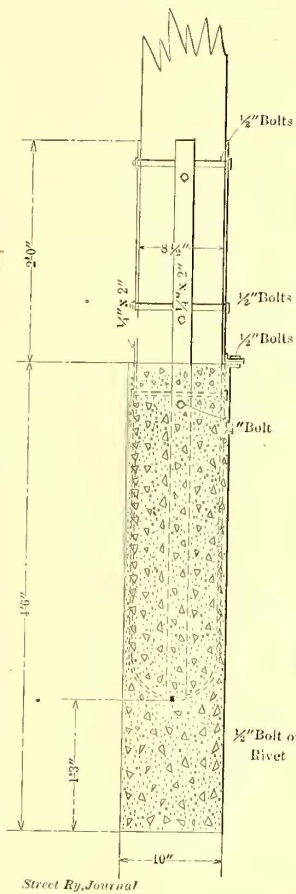
A LAND COMPANY SUCCESSFULLY OPERATED IN CONNECTION WITH A RAILWAY

William B. Strang, who owns the Kansas City & Olathe Electric Railway, known as the Strang line, two years ago selected a route on top of a high ridge extending along the historic Santa Fe trail and surveyed for a line from Kansas City to Olathe, Kan. When Mr. Strang put his engineering force in the field he purchased 3000 acres of land adjacent to his proposed railroad and organized the Strang Land Company, which opened up beautiful town sites along the route of the line and advertised them extensively in the local press in Missouri and Kansas, announcing that lots would be sold at public auction, and free transportation would be furnished to all who wished to attend the sale. During the three days the sale lasted the company furnished transportation to about 4500 and sold nearly all the lots. The company has drilled gas wells on all the town sites, and all who build will be furnished natural gas free of charge. The land company has proved to be a profitable subsidiary to the railroad company by encouraging traffic and settling the country along the line.

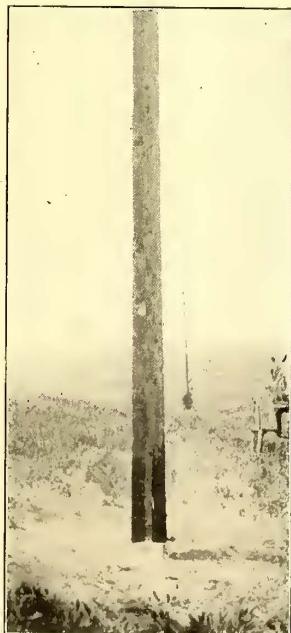
Sir Thomas Shaughnessy, of the Canadian Pacific Railway Company, announces that his company is considering the substitution of electric for steam locomotives for use on heavy grades in British Columbia. Several tests that have been made of late have proved entirely successful, and the company's engineers are satisfied with the plans.

CONCRETE STUBS FOR POLE LINE CONSTRUCTION

A concrete stub which is meeting with favor in pole-line work is being introduced by M. H. Murray, of Bakersfield, Cal. The idea is to isolate the pole from the ground and so prevent deterioration through moisture and from other causes, and also to brace the pole as shown in the accompanying illustration. The advantage of these prepared bases over bases built on the site as required, as has been done in some installations, is readily apparent. The transportation of material and supplies is done away, and the delays and inconveniences incident to such work are entirely eliminated, the regular equipment of the pole line gang being the only equipment required. Another feature is that the bases can be easily installed on lines already in operation without interfering with the transmission, as was done in installing 150 of the bases for the Power, Transit & Light Company, of Bakersfield, while the line was carrying 11,000 volts. These bases are 4 ft. 6 ins. high by 10 ins. wide, and the poles are sunk to a depth of 3 ft. 3 ins. In the accompanying illustrations a pole is shown with the base along side and 11,000 volts on the line while operation is going on, and



CONCRETE POLE BRACE

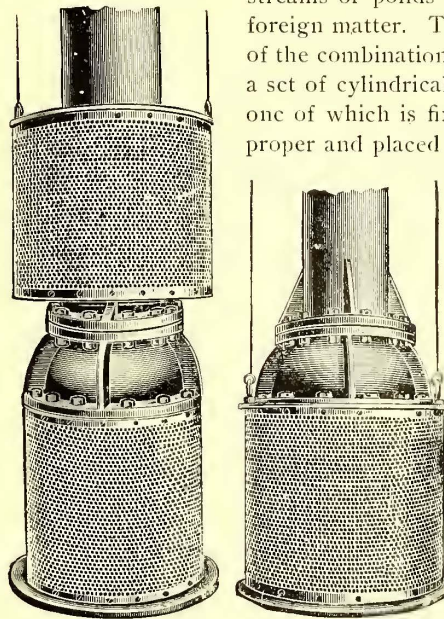


POLES IN POSITION WITH BRACE ATTACHED

another with the work completed. The bases are also being installed at Emeryville, Oakland, Cal., on the Key Route Railway.

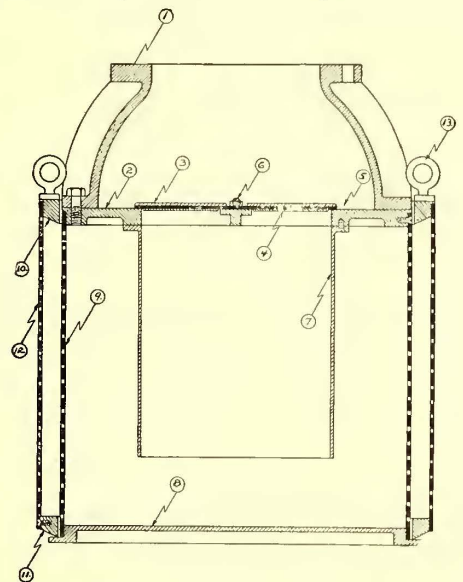
A FOOT VALVE THAT CAN BE EASILY CLEANED

The Newman Manufacturing Company, of New York, is making a foot valve, designed with a view of automatically obviating, as nearly as possible, the trouble caused through the entry of refuse into the pipes of water systems, thus making possible the taking of water continuously from streams or ponds where there is much foreign matter. The apparatus consists of the combination of a foot valve with a set of cylindrical screens, the smaller one of which is fixed to the foot valve proper and placed within the other and so arranged that the larger or outside one can be raised above the water line for cleansing without the necessity of disconnecting the valve or stopping any part of the plant. Refuse, such as leaves, fish, sticks, paper, rags, etc., that lodge against the outer screen is easily removed therefrom by bringing the



VIEWS SHOWING OUTER SCREEN RAISED AND OUTER SCREEN RESTING ON BOTTOM PLATE

screens to the surface of the water by means of ropes or chains attached to screw-eyes. In all cases, except those of large size valves, one man can attend to the cleaning in a very few minutes. As the outer screen is lowered again into position the knives or scrapers attached to it at top and bottom scrape over the outer sur-



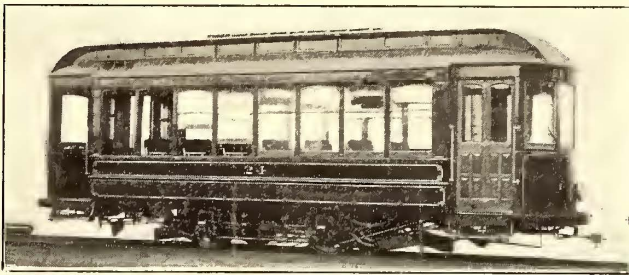
THE GENERAL CONSTRUCTION OF VALVE

face of the inner screen and clean it. By means of the suction-pipe extension the suction is brought to within a few inches of the bottom plate of the valve, thus permitting successful operation in shallow water. In cases where the lift is not great and the suction pipes are short and foot valves are not a necessity, the company recommends the continuous service foot valve screens.

SEMI-CONVERTIBLE CARS FOR PEEKSKILL, N. Y.

To meet rapidly increasing business, the Peekskill Lighting & Railroad Company has added a number of Brill grooveless post semi-convertible cars to its equipment.

The company operates a 12-minute schedule on its main line which runs from the New York Central & Hudson



EXTERIOR OF PEEKSKILL CAR

River Railroad passenger station to Lake Mohegan, a distance of 5 miles, traversing a rolling country to a point 740 ft. above the Hudson River. It is the intention of the management shortly to extend this line through to Shrub Oak and Jefferson Valley. On the Verplank Point line a 20-minute schedule is in effect, but greater things are expected of Verplank when the State park is opened in 1909. The company now has two amusement parks, Shady Lake Park and Electric Park, which are open for the summer months only.

The new cars for the line are generally similar to the single truck semi-convertibles which have been described in the *STREET RAILWAY JOURNAL* from time to time. They measure 20 ft. 8 ins. over the end panels and 30 ft. 1 in. over the vestibules; the width over the sills, including the sheathing, 7 ft. 8½ ins.; over the posts at the belt, 8 ft.; the size of the side sills is 5 ins. x 3¾ ins., and of the end sills, 3½ ins. x 6⅝ ins. The cars have plush seats; the inside finish is in cherry, and the ceiling of birch. No. 21 E truck used on the cars has a 7-ft. wheel base.

CYPRESS FOR POLES AND TIES

While cypress is a soft wood and necessitates the use of tie-plates when used for ties, it possesses natural advantages peculiarly its own which make it especially advantageous for use in railroad work. This is especially true in the case of poles, for cypress grows very straight and tapers only about 1 in. in 10 ft. of length. The quality of strength and the ability of cypress to resist moisture have been appreciated since the time of the ancients, many of the mummies being buried in cypress caskets. The reason for the long life of cypress is not far to seek. It is a swamp timber, and only reaches its highest development where the ground is quite moist. Naturally, when cypress is cut and replaced in moist soil, as is frequently the case in pole and tie work, it is merely a return to a natural environment, and though now lumber it still remains almost immune to excessive moisture—a condition that would be sufficient of itself to cause rapid deterioration of other woods. The satisfactory use of cypress in steam railroad work led to its introduction for use for poles and ties in electric railway construction, and has caused many dealers heretofore deal-

ing exclusively with the steam railroads to turn their attention as well to meeting the demands of the electric railways for ties and poles. Among the companies thus catering to the requirements of the electric railway companies is the Kennett Cypress & Hardwood Lumber Company, of Davenport, Iowa, which owns extensive lands with mills at McKay, Mo. This company is constantly cutting and carries on hand stock from which it is prepared to meet demands at short notice.

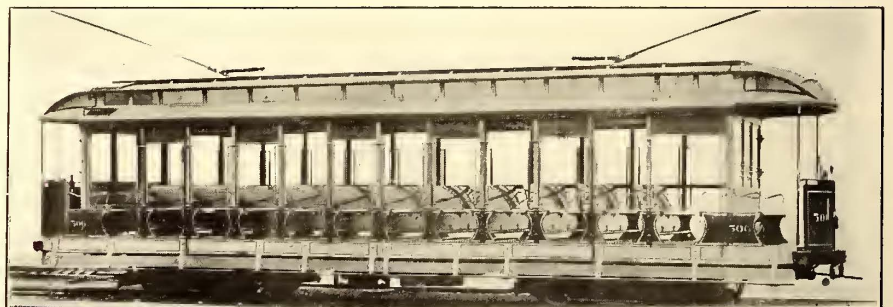
NEW LINE SUCCESSFUL

The new through electric railway between Worcester and Springfield, which was opened July 5, has proven very successful from the point of view both of the company and the public. This line was made up by a continuation of the Worcester & Southbridge from Sturbridge, and of the Springfield & Eastern from Palmer, both lines being under the control of the New Haven. The Worcester & Southbridge was originally built for the operation of high-speed cars, and the Springfield & Eastern has been largely reconstructed to meet the demands of a fast schedule. The roadbed of the intervening track is of first-class construction.

THIRTY-FIVE CARS FOR THE WORCESTER CONSOLIDATED RAILWAY

The Worcester Consolidated Railway Company has added to its equipment thirty-five cars built by the John Stephenson Company. Ten of these are fifteen-bench open cars, one of which is illustrated, and the order also included fifteen 30-ft. closed and five 34 ft. of the same type. Aside from the new equipment the company operates 326 passenger cars over about 140 miles of track.

The features and chief dimensions of the car illustrated follow: Length over its end posts, 34 ft. 2½ ins.; over the crown pieces, 42 ft. ¾ ins.; width over the sills, including the sheathing, 7 ft. 9 ins.; over the posts at the belt, 8 ft. 2 ins.; height from the floor to the ceiling, 8 ft. 2⅝ ins.; from the track to the under side of the sills, 2 ft. 6 ins.; from the track to the running board, 20½ ins.; size of the side sills, 4½ ins. x 8½ ins.; center sills, 4½ ins. x 7½ ins.; cross-bars, 4½ ins. x 4½ ins.; end sills, 5 ins. x 6¾ ins.; sill plates, 10 ins. x ¾ in. The trucks are of the No. 27 G-1



OPEN CAR FOR WORCESTER

type with 4-ft. 6-in. wheel base and four 40-hp motors are used. The weight of the car and the trucks with the electrical equipment is 43,400 lbs.

The fifteen 30-ft. closed cars referred to have longitudinal plush seats, as they will be operated in the city; the five 34-ft. closed cars will be operated in the outlying districts and have transverse seats of cane; the latter cars have straight sides.

FINANCIAL INTELLIGENCE

The Money Market

WALL STREET, July 24, 1907.

About the only unfavorable development in the monetary situation during the past week was the strengthening of the foreign exchange market, which suggested the possibility of a resumption of the outward movement of gold to Europe. The upward movement in exchange carried rates for prime demand sterling to within a small fraction of the point at which gold shipments could be made to Paris provided the Bank of France should offer the same inducements as were recently allowed by that institution to draw gold from this side. At the present time there are no indications that the French bank will allow interest on the gold while in transit, but if such a decision should be reached by the managers of the Bank of France, it is not believed that any considerable amount of the yellow metal would be sent forward at this time, as such operations would undoubtedly result in an advance in money rates here, which would serve to check the outward movement of gold. Otherwise the developments of the week were of a favorable character. The payment of a 20 per cent instalment on account of the Union Pacific new 4 per cent bonds and the payment of 50 per cent instalment on the General Electric Company's new issue were made without causing the slightest disturbance in the local money market. The demand for money from stock exchange houses was very moderate, and there was a noticeable falling off in the demand from railroad and other corporations. Bankers, however, reported an increased demand from mercantile sources. During the week the surplus reserve of the New York City banks were augmented by a substantial gain in cash, and present indications point to a further substantial increase in the cash holdings during the current week. Since last Friday the local institutions have gained nearly \$2,000,000 from the Sub-Treasury, despite the falling off in Government disbursements on account of pensions, etc. Money is reported in active demand at all of the leading interior centers, but the demand upon the New York banks from the West for crop-moving purposes will be at least a month later as a result of the unfavorable planting weather at the beginning of the season. At the close of the week there was nothing in the situation, barring the possibility of gold exports to Europe, to cause any decided change in rates for money. Preparations will soon be made for the payment of the August 1 interest and dividend disbursements, which are estimated at \$70,000,000, but these payments will be made without causing anything more than a temporary flurry in interest charges, which usually accompany such operations.

The bank statement published on last Saturday made a favorable exhibit. Loans increased \$414,100. The increase in cash amounted to \$2,768,900. Deposits increased \$2,231,500, which resulted in an increase in the reserve required of \$557,875. The surplus was therefore increased by \$2,211,025, bringing the total surplus up to \$9,088,075, as compared with \$19,391,000 in 1906, \$14,949,950 in 1905, \$50,609,600 in 1904, \$18,915,400 in 1903, \$16,502,400 in 1902, \$21,029,375 in 1901, and \$24,081,900 in 1900. Money on coal loaned at 4 per cent and at 2½ per cent. Time money was quoted at 4½ per cent for sixty days, 5¾ per cent for ninety days, 5¼ per cent for four months, 5½ for five months, and 5½ and 6 per cent for six months.

The Stock Market

There was a decided improvement in the stock market during the past week. Trading was upon a somewhat larger scale, and while prices displayed heaviness at times the general trend of values was toward a higher level. Speculation continued largely professional in character, although some increase in the volume of commission house business was reported. There was also a perceptible improvement in the bond market, the high grade railroad bonds and the short-time notes being in fairly active demand at slightly better prices. During the first half of the

week prices advanced rather sharply under the lead of Union Pacific, Southern Pacific and the Hill stocks, and later on Atchison developed considerable strength, and substantial gains were recorded in other parts of the list. The strength in Union Pacific and Southern Pacific was based upon the extremely favorable showings made by both companies in their preliminary statements of earnings for the fiscal year ended June 30. The heavy increase in earnings gave rise to reports that the dividend rate on Southern Pacific would be increased, but no definite information was obtainable on that point. Other developments working in favor of higher prices was the action of the Amalgamated directors in declaring a quarterly dividend of \$2 per share, thus putting the stock upon a straight 8 per cent annual basis. The crop news coming to hand was generally favorable, and railway traffic returns continued to show substantial gains over those for the corresponding period of last year. During the last half of the week the market developed heaviness. The bear element took advantage of the strike of the ore handlers at the mines of the United States Steel Corporation in Minnesota to sell stocks, and some stress was laid upon the talk of a resumption of gold exports to Europe. At the close of the week, however, the market developed renewed strength, and in some instances prices reached the highest points of the present upward movement.

The local traction issues were depressed, there being a disposition on the part of traders to await the outcome of the investigation of these properties by the Public Service Commission.

Philadelphia

The extreme dulness prevailing in the general securities market during the week was reflected to a great extent in the traction issues. Trading in them was upon an extremely small scale, and while firmness was shown in some of the inactive issues, the general trend of values was toward a lower level. Philadelphia Rapid Transit sustained an early loss of a full point, but subsequently recovered nearly all of the decline. Philadelphia Traction and Union Traction, however, showed weakness, both issues losing ½ point, the former to 94 and the last named to 57½. American Railways ran off to 48½ and Consolidated Traction sold at 72½. Philadelphia Company advanced to 40½. United Railways of San Francisco brought 43, and Union Traction of Pittsburg preferred advanced to 46. United Companies of New Jersey also advanced a fraction to 245½.

Chicago

Opposition to the proposed plan of reorganization of the Chicago Union Traction Company has developed on the part of the bondholders of the underlying companies, and it is reported that either material changes in the present plan or the adoption of a practically new plan will be necessary. Trading in the local traction issues was extremely quiet during the week, but prices held firm. North Chicago advanced to 45¾, and West Chicago rose from 32 to 33. Northwestern Elevated preferred sold at 66.

Other Traction Securities

Interest in the Baltimore tractions centered almost entirely in the United Railway issues, all of which displayed decided strength. The stock scored an extreme gain of nearly a point to 13¾, while the incomes moved up from 53 to 54 on the exchange of about \$27,000 bonds. The 4 per cents sold at 86 and the refunding 5s brought 80. Norfolk Railway & Light 5s changed hands at 94. The Boston market was dull but steady. Boston elevated advanced to 135½, and West End common and preferred rose ½ and 1 point, respectively. Massachusetts Electric common sold at 16 and the preferred at 58 and 57½. Boston & Worcester brought 23¾ and 23½.

Security Quotations

The following table shows the present bid quotations for the

leading traction stocks, and the active bonds, as compared with last week:

	July 17	July 24
American Railways	48½	48
Boston Elevated	135	136
Brooklyn Rapid Transit	57½	57¾
Chicago City	150	160
Chicago Union Traction (common).....	3	—
Chicago Union Traction (preferred)	15	—
Cleveland Electric	45¼	46½
Consolidated Traction of New Jersey.....	72½	71
Detroit United	67¼	—
Interborough-Metropolitan	16¼	16½
Interborough-Metropolitan (preferred)	45	44¾
International Traction (common)	45	—
International Traction (preferred), 4s.....	67	—
Manhattan Railway	132	130
Massachusetts Elec. Cos. (common).....	16¼	15
Massachusetts Elec. Cos. (preferred).....	56	56
Metropolitan Elevated, Chicago (common).....	23	22
Metropolitan Elevated, Chicago (preferred).....	64	64
Metropolitan Street	a91	a91
North American	68¾	68¼
North Jersey Street Railway	40	40
Philadelphia Company (common).....	40	40½
Philadelphia Rapid Transit	23¼	22½
Philadelphia Traction	—	94
Public Service Corporation certificates.....	—	66
Public Service Corporation 5 per cent notes.....	—	90
South Side Elevated (Chicago)	82	80
Third Avenue	104	104
Twin City, Minneapolis (common)	92½	95
Union Traction (Philadelphia)	58	57

a Asked.

Metals

The "Iron Age" says that the unwarranted strikes of the dockmen at the upper Lake Superior shipping harbor and of the Messaba mines have no immediate effect upon production, since the blast furnaces are supplied with ore. Any prolonged suspension of work will probably lead to the blowing out of some furnaces which have been in need of repairs. There has been rather more inquiry for all grades of pig in nearly all the markets during the past few days, induced possibly by the labor troubles at Lake Superior. Car builders have taken some fresh business with more under negotiation.

Copper market continues very dull and prices are unchanged.

ANNUAL OUTING OF OFFICERS OF NEW YORK CITY RAILWAY COMPANY

The annual outing which President Vreeland, of the New York City Railway Company, extends to the officers and heads of departments of that company, occurred on July 24, and was held as usual at Brewster, N. Y. About eighty were present, including a few officers connected with steam railroad companies entering New York City and others who were especially invited. The day was an ideal one and the clam bake, which was as fine as usual, was greatly enjoyed. It was held on the shore of Tonetta Lake, on the grounds of the Tonetta Outing Club. A special train leaving Grand Central Station about 9 o'clock in the morning took the guests to Brewster, and a special train carried them home in the evening after they had spent a delightful morning at the club and afternoon at President Vreeland's summer residence, where they had an opportunity of meeting Mrs. Vreeland, who received with a number of ladies residing in Brewster.

CONNECTICUT COMPANY ORDERS CARS AND EQUIPMENT

The Connecticut Company, acting for the New York, New Haven & Hartford Railroad, is reported to have placed an order for 103 closed trolley cars, costing approximately \$5000 apiece; twelve snow plows at \$2500 each, with much other material for operation. It is estimated that the order will entail a total expenditure of \$600,000. The 103 closed cars at \$5000 each will total \$515,000. The snow plows will cost \$35,000 more, while \$50,000 will go for the other equipment.

THE AFFAIRS OF THE HAVANA COMPANY

Warren Bicknell, president of the Havana Electric Railway Company, has returned to his home in Cleveland, after a short visit to Havana. He says that the business of the company is showing a handsome increase, but otherwise there is little that can be said at the present time. General Manager Frank Steinhart furnishes Mr. Bicknell with a weekly statement of the business each day as compared with the corresponding day of last year, and a chronological history of events as they occur, including the various transactions that have taken place, closing contracts that have been under way, changing of schedules, number of cars in operation, both regular and special, accidents of all kinds, etc. Mr. Bicknell made a study of the power house and succeeded in reducing the operating expense and at the same time increased the efficiency of the plant.

ELECTRIC SERVICE BEGUN ON NEW HAVEN

The New York, New Haven & Hartford Railroad began on Wednesday, July 24, the operation of trains over its electrified line between the Grand Central station and New Rochelle, with a service of ten trains a day, five each way daily. The company had planned to begin the service on the previous Sunday, but this was abandoned and the date fixed for Wednesday. The trains operated by electricity are: westbound, 7:50 a. m., 8:05 a. m., 8:28 a. m., 8:37 a. m.; eastbound, 6:28 a. m., 7:20 a. m., 5:06 p. m., 5:16 p. m., 5:45 p. m. They are made up just as the steam trains were, of four or five coaches to meet the requirements of the service. The system installed is the Westinghouse single-phase, and the installation, including both power house and locomotives, has been referred to from time to time in these columns. As previously stated, H. Gilliam, formerly with the Westinghouse Company at Pittsburg, has been appointed electrical superintendent, in charge of electric operation, with headquarters in Stamford, with jurisdiction over the maintenance and operation of electric transmission lines, with accessories, power house and electric locomotives, on the New York division. These other new officers previously referred to briefly in the STREET RAILWAY JOURNAL, have also been officially announced with their duties:

C. L. Peterson is chief engineer of the power station at Stamford, having charge of operation and maintenance of station equipment. In all matters pertaining to the operation and maintenance of the power station, he will receive his instructions from the mechanical superintendent. All requisitions on the mechanical department are to be approved by the electrical superintendent.

The maintenance and operation of electric locomotives and instructions to motormen and their helpers, will be under the jurisdiction of J. C. Welsh, road foreman of electric locomotives, who shall receive his instructions in electrical matters pertaining to the operation and maintenance of the electric locomotives from the electrical superintendent. In mechanical and ordinary routine matters he will report to the master mechanic in the usual manner. Requisitions and accounts will be controlled in the master mechanic's office.

The supervisor of bridges will have charge of the maintenance and repairs of all bridges and culverts and of the catenary bridges and electric transmission lines. He shall report to the division engineer in all ordinary and routine matters, and to the electrical superintendent in all matters relating to the character, method and execution of all maintenance, repairs and restoration of catenary bridges, transmission lines, and other appurtenances and otherwise excepted. All routine reports, materials and payroll distributions, methods of accounting, etc., will be handled through the division engineer's office, being noted for his information, as far as desired, by the electrical superintendent. The electrical repair car and force in connection with the same shall be under the jurisdiction of the supervisor of bridges.

Repairs to track and track bonding will be under the charge of the roadmaster, reporting through the division engineer to the engineer, maintenance of way. The electrical superintendent shall supervise and direct the proper installation and maintenance of track bonds through the engineer, maintenance of way.

D. E. Tyree is appointed electrical inspector, who will report direct to the electrical superintendent. The electrical inspector will have access to the power station and the privilege to inspect the electrical locomotives during operation.

CITY CLUB REPORT ON NEW YORK TRANSIT

The City Club of New York has sent a report to the Public Service Commission for the New York City district, containing its recommendations for action of the commission in the city transportation systems. Briefly, they are as follows:

For the Brooklyn Bridge, the club recommends for immediate relief the use of two or more platforms, instead of one, during the rush hours at the New York terminal of the elevated bridge lines, and the establishment of a surface line from the east end of the Williamsburg Bridge to the City Hall. It also recommends as soon as possible the operation of all elevated trains crossing the Brooklyn Bridge into a sub-surface terminal, and an effort to effect an agreement between the Interborough Company and the Brooklyn Rapid Transit Company so that free transfers will be issued at Borough Hall and beyond to and from the new Brooklyn-Battery tunnel.

For the subways it recommends the use of Illinois Central type of cars, to shorten the station stops and increase the number of seats, and that more trains be run during the slack hours and on Sundays. For additional convenience and safeguards, it advocates the use of illuminated signs on the outside of every car, destination signs on the interior, more station signs, better car illumination and the engagement for permanent service of a qualified sanitary expert. Modifications in the present form of construction are recommended in the form of a concrete floor through the subway and immediately in the vicinity of stations, and the installation of fire hydrants, more emergency stairways and additional means of ventilation. For extensions, the club believes it very desirable to complete the subway loop by extending it south from the Brooklyn Bridge through Nassau Street and thence by a new tunnel to Brooklyn; the construction of an extension under Flatbush Avenue to the south side of Prospect Park; the Fourth Avenue line in Brooklyn, and the construction of a subway south from Times Square to the Battery via Seventh Avenue and West Broadway, if private bidders cannot be found for this line. In this connection the report states that on May 25 last 3001 persons entered the subway at the Grand Central Station in one hour, all southbound. This number is sure to increase, and in three or four years from thirty to forty trains an hour will be necessary to transport south those who pour into the subway at the Grand Central. It is therefore recommended that a direct way of going downtown for the people of the upper West Side is essential.

For the elevated roads, as a relief for overcrowding, the report recommends the operation of additional trains on all lines, and an increase in the length of trains. For additional convenience and safeguards it recommends the inclosure of platforms and the more careful cleaning of cars. For extensions, it recommends the installation of a third track on the Second and Third Avenue lines, but only if such an extension can be done without double-decking the structure and without deterring others from bidding on an East Side subway, and provided the company agrees to change its roadbed so as to reduce noise according to the best known methods.

For surface lines, the report requires the operation of more cars and the use of trains of two cars, which is a plan reported to be in successful operation in Washington, Boston and Columbus. The experimental use of double-deck cars on badly congested streets is also recommended. Under the heading of "additional conveniences and safeguards" it recommends the universal transfer system between all elevated, surface and subway lines, vestibules on all cars, power brakes, effective wheel guards, cross seats, experiments with the Montreal fare system, clearer destination signs, that all conductors be furnished with pocket guides of local information, and that all cars be supplied with jacks and emergency tools. For changes in tracks, roadbed and car houses, the report recommends immediate electrification of all lines using horse cars, the removal of unused car tracks, the use of automatic sprinklers in the present car houses and the fireproof construction of all new car houses.

Under the heading of "general investigation," the report recommends a comprehensive investigation of the transportation needs of the city. This would include a study of the districts between which people travel, the effect of the new transit lines on the movement of population, the unoccupied territory in the city and vicinity, where new business centers are being established, whether there is any tendency to move factories to outlying districts, whether the increasing vehicle and pedestrian traffic will require any changes in grades of street surfaces at

street crossings and the relative efficiency of bridges and tunnels.

The report concludes with a recommendation of the suspended mono-rail system in use at Barmen-Elberfeld, in Germany.

CHICAGO, MILWAUKEE & ST. PAUL ELECTRIFICATION OUT OF CHICAGO

The Northwestern Elevated Railroad and the Chicago, Milwaukee & St. Paul are said to be preparing to accept the ordinances of the city of Chicago and of the city of Evanston, authorizing the companies to join their roads at the terminal of the Northwestern Elevated by a gradual incline, and to electrify the road between Chicago and Evanston. It is planned to substitute at an early date for the St. Paul suburban steam railroad an improved service on the Evanston division of the electrified road. President Starring states that not only will there be an improved service free from the smoke and cinders of the steam road, but the interval between cars will probably be shortened to 5 minutes. The schedule time between Davis Street, the central station of Evanston, to Van Buren Street will be 40 minutes. Bids are being received by the Northwestern Elevated for an order of forty new coaches of a special and improved design, to be used in the extended service of the road.

No definite announcements can yet be made concerning the financing of the new enterprise. The road is to be electrified and operated jointly by the Northwestern Elevated and the St. Paul. According to the ordinance, the fare from any point within Chicago to any other point of the road within the city limits shall not be greater than 5 cents, but there will be an additional fare for transportation from Chicago to Evanston, the exact amount of the tariff not being yet determined. The ordinance must be accepted within sixty days from its passage, and the service must be installed within a year from the acceptance of the ordinance.

ELECTRIFYING MORE NEW YORK CITY LINES

Work is now under way on the electrification of the First Avenue line of the New York City Railway Company from the Harlem River to Fifty-Ninth Street. Gangs of men are at work tearing out the old horse car rails and installing the new system at Ninety-Sixth Street, Eighty-Sixth Street and Fifty-Ninth Street. It is intended also to soon start a force at work at 125th Street, and the work will be vigorously carried on from these four points with a total force of about 2500 men, which will be organized as rapidly as possible.

With the completion of the new track from Fifty-Ninth Street north the electrification of the line south of that point to Forty-Second Street and from Thirty-Fourth Street to Twenty-Third Street will begin, and it is expected that this much of the work can be finished this summer. With the intermediate sections of this line which have already been electrified, the completion of the work outlined will give First Avenue an electric line north from the Williamsburg Bridge, thus greatly improving the surface line facilities on the East Side.

With the complete electrification of the First Avenue line there will be a direct electric route from the Harlem River to the postoffice, which will connect all of the bridges, built and building, but on account of the delay in getting the work started this cannot be accomplished until next summer.

It was intended to begin the electrification of the First Avenue line and of the Twenty-Eighth and Twenty-Ninth Streets cross-town line on April 1. The contracts had been let and all of the material had been delivered by that date, but there was an unexpected delay in securing the necessary permits from the city. The final permit was not secured until last week, and immediately on its issuance the electrification work was taken up.

On account of this delay, however, and the further delay incident to the organization of a large force of men, the electrification of the Twenty-Eighth and Twenty-Ninth Street lines probably will have to go over until next summer, as the work cannot be carried on after frost is in the ground. It is doubtful if the electrification of the First Avenue line can be carried out south of the Williamsburg Bridge.

TRANSIT INQUIRY IN NEW YORK—OTHER MATTERS

The Public Service Commission, whose jurisdiction extends over New York City, has decided to make a complete investigation of the transit situation in the city. Questions of operation of the various lines, transfer facilities, etc., will all be gone into thoroughly. August Belmont, when he learned of the Commission's action, said:

"The Interborough-Metropolitan Company will meet the Commission in a straightforward and cordial spirit, and will cooperate with it in every way possible."

President Theodore P. Shonts, of the Interborough-Metropolitan, said:

"The interests which I represent will meet the Commission half way and give them all the information they want and all the assistance we can. We only ask that they study both sides of the question, for there are two sides to it. I believe that with real co-operation the work of the Commission can be very helpful to the public and to us."

President Edwin W. Winter, of the Brooklyn Rapid Transit Company, said:

"We will aid the Commission in every possible way. It is likely that some way of improving the service may be found, and improvements are what the company is looking for. We will probably get some help from the Commission."

When the Commission met, Chairman Willcox brought up the subject of a transit inquiry. He said:

"I regard it as fundamental to the proper performance of the duties of this board that it should, at the earliest possible day, familiarize itself thoroughly through proper investigation and report with all of the conditions of fact and of law which are raised or created by the present actual organization and operation of the street railways of this city.

"This report of facts, when completed to the satisfaction of the board, will constitute the basis for its determination as to what its duties actually are, and the extent to which and the manner in which it can treat or deal with the existing railway companies in respect to future franchises, as well as in respect to operation of the railways of the city under the franchises already enjoyed by each corporation."

He then presented the resolution, which was adopted, as follows:

Now, therefore, be it Resolved, That this Commission shall forthwith, as required by sections 45 and 48 of the Public Service Commission's law, investigate and examine the general condition of the Interborough-Metropolitan Company and the Brooklyn Rapid Transit Company and of all companies controlled by and operated in the interest of either of the said companies, their capitalization, their franchises, and the manner in which their lines, owned, leased, controlled or operated, are managed, conducted or operated, including the adequacy, security and accommodation afforded by their service, and with respect to their compliance with all provisions of law, and also for the purpose of determining as the result of such investigation whether the said corporations do in fact illegally and as monopolies control and operate the several properties now under their control and operated in their interests, for the purpose of determining what is the capacity of each of the individual corporations so owned and controlled to render adequate service as required by law, and for the purpose of determining and performing the duties of this Board in the premises.

A supplementary resolution was passed giving Commissioner Wilson entire charge of the investigation. He has not yet decided when the investigation will begin.

The Public Service Commission has adopted a resolution changing the date of the public hearing on the form of the contract for the Fourth Avenue Subway in Brooklyn from July 25 to July 30. The adjournment was rendered necessary because of certain delays in printing the contracts. This rapid transit route is intended to run from Chrystie Street in Manhattan, across the Manhattan Bridge, and under Fourth Avenue and other streets in Brooklyn, with the four tracks, to Fortieth Street and Fourth Avenue. At this point a branch with two tracks is to run to Fort Hamilton, and another with two tracks to Coney Island. The total cost of the entire subway is estimated to be \$23,000,000. The contract for construction is to be let in sections, the entire work being divided into fourteen sections. The hearing on the 30th of July will be on five of these sections, the portion of the subway from Nassau to Forty-First Street, with the exception of the section from Ashland Place to Sackett Street, for which the plans are not yet ready.

The Public Service Commission is giving this hearing for the purpose of hearing objections to the features of the form of contract as drafted. Copies of these contracts may be obtained at the office of the Commission, which, under the law, must sell them for ten cents a copy.

William M. Ivins, special counsel for the Public Service Commission in its inquiry into the Interborough-Metropolitan and Brooklyn Rapid Transit systems, conferred, Wednesday, July 24, with the Commissioners, but refused to announce his plans. The Merchants' Association sent a communication in regard to moving platforms. The association urges this as the most practical and immediate method of solving the Brooklyn Bridge crush problem. The communication concluded with the suggestion that a hearing should be held at which experts only should be heard.

DATA SHEET ON INSURANCE

The insurance committee of the American Street & Interurban Railway Company is sending out this week a data sheet, requesting information from member companies on the subject of insurance. The committee is made up of H. J. Davies, chairman, of Cleveland; A. H. Ford, of New York; G. L. Estabrook, of Philadelphia; C. O. Kruger, of Philadelphia, and R. B. Stearns, of Highwood, Ill. The material obtained by means of these blanks, together with such other material as may be collected by the committee, will be used as a basis of the final report to be presented at the Atlantic City convention in October. The question of giving publicity to any special information will be considered from the standpoint of its effect upon the individual company and also upon the interests of the association in general, but information marked confidential will be so considered. The accompanying letter states that the committee wants not only to present statistics at the Atlantic City convention on the cost of fire insurance, losses sustained and amounts recovered from the insurance companies, but to collect statistics showing the origin of fires and also to compare forms of policies. For this reason companies are requested to send copies of the descriptions of the properties insured. The questions asked follow:

1. Company. 2. City. 3. State. 4. Urban or interurban system.

5. Premiums paid or funds set aside for fire insurance, losses sustained and amounts received from insurance companies for losses. This is to be given for the last five years and should show the amount of insurance carried, premiums paid, average rate per \$100 of insurance, insurance fund, losses and amounts received.

6. State origin of fire (if you have had a fire), and particularly whether or not the fire started in a car. 7. State cause of fire, as far as possible. 8. Describe briefly any improvements which have been made in your properties with a view to preventing a recurrence of fire.

9. What fire protective devices do you employ? 10. Have you a fire organization among your employees? 11. What instructions do you give employees in regard to the preventing and extinguishing of fires? 12. What portions of your property are you not carrying with insurance at the present time?

13. (a) Have you equipped any car houses with automatic sprinklers? (b) If so, do you use the aisle sprinklers? (c) Have your sprinklers prevented fires? 14. Have you had any trouble with aisle sprinklers interfering with the operation of your cars in the car house? 15. If you have installed automatic sprinklers, do you consider them objectionable from an operating point of view? 16. Have you an employee whose sole duty it is to inspect your properties, with a view to safeguarding them against damage by fire?

17. Insurance companies will frequently grant a reduction in rates upon the making by the insured of improvements recommended by them, especially if such rebate or reduction be asked for before or at the time the improvement is made. (a) Have you obtained any such reduction or rebate? (b) If so, for what improvements? (c) What amount per \$100 of insurance?

18. (a) Have you obtained a reduction in rates of insurance within the past three years? (b) If so, please state the reasons for the reduction. 19. Important.—Please enclose copies of the forms attached to your insurance policies.

THE CLEVELAND SITUATION

Lightning struck the power house of the Forest City Railway Company at Cleveland, Tuesday, July 16, and the generator was so badly injured that it was necessary to send out of town to have some of the parts replaced. As a result, the road was compelled to suspend operation for the remainder of the week. A request was made to the Cleveland Electric for power, but President Andrews replied that his company did not consider that the Forest City Company existed legally and that it did not care to aid in the operation of a line that is being run in violation of law.

Councilman John D. McLain has brought suit against President Horace E. Andrews to recover \$50,000 damages, on the allegation that Mr. Andrews made the statement that McLain had accepted \$1,000 for his vote and that the money came from Mayor Johnson. This is the first personal damage suit that has grown out of the traction fight in the Council.

Owing to the fact that the Forest City Railway Company had failed to make a statement of its condition, as required by the rules, the governing committee of the Cleveland Stock Exchange ordered that its securities be removed from the listed to the unlisted column. This brought forth a report of the financial condition of the company. Just what action the Exchange will take now is not known. The statement of money expended for construction and equipment of the Forest City Railway is as follows:

Consents	\$24,705.84
Legal services	44,719.25
Injunctions	6,051.88
Miscellaneous organization expenses.....	3,365.35
Engineering and superintendence.....	2,478.93
Track and roadway construction.....	240,844.60
Paving	81,999.24
Electric line construction.....	87,278.94
Real estate used in operation of road.....	4,590.55
Building and fixtures in operation of road.....	24,227.24
Power plant equipment	137,718.00
Shop tools and machinery.....	4,060.00
Cars	141,756.63
Electric equipment of cars.....	59,683.04
Miscellaneous equipment	2,800.23
Interest and discount.....	16,373.02
Miscellaneous	25,533.06
Private siding, Denison Avenue.....	9,045.04
Furniture and fixtures.....	1,891.61
Uniforms	1,530.68
Municipal Traction Company.....	8,191.04
Trailers	11,141.80
Total	\$939,985.98

Statement of General Ledger, May 31, 1907:

ASSETS

Franchise account	\$200,000.00
Petty cash, not including any Municipal Traction trust fund	1,552.89
Petty cash kept in the office of the Municipal Traction Company for payments of claims and other items.....	3,000.00
Cash account Municipal Traction trust fund, kept in Citizens and United Banks	306.13
Fred C. Alber, due on \$909,570 stock allotted.....	\$47,124
Stock not allotted.....	965,430
Disbursements on C. & E. Ledger since Oct. 13, 1903.....	939,985.98
Taxes paid to date.....	1,440.32
Bills receivable	157.50
Net rental received from Municipal Traction Company.....	26,641.55
Total	\$2,185,638.37

LIABILITIES

Capital stock	\$2,000,000.00
Bills payable	158,996.82
Dividend payments to stockholders.....	26,641.55
Total	\$2,185,638.37

MUNICIPAL TRACTION COMPANY

Quarter ended June 30, 1907—

Traffic receipts, car earnings.....	\$40,455.22
Traffic receipts, ticket sales.....	185.29
Earnings from other sources.....	735.06
Gross earnings	\$41,375.57
Total operating expenses.....	\$23,649.38
Rental paid to Forest City Railway Company.....	13,952.00
Total	37,601.38
Net earnings	\$3,774.19

The Cleveland Electric Railway Company has filed suit in Common Pleas Court, asking that the Forest City Railway Company, the Low Fare Railway Company and the Municipal Traction Company be enjoined from using any of its property. This petition, if granted, would confine the new companies to the territory now occupied by them on the West Side. They could not get to the East Side at all.

In this suit practically the same allegations are made as were incorporated in the suit asking that the companies be enjoined from using the Euclid Avenue line from the Public Square to East Fourteenth Street. It is stated that the franchise around the Erie Street Cemetery was granted the Low Fare Company so that extensions might be made over routes now occupied by the Cleveland Electric without the necessity of securing franchises through competitive bidding. The story of the midnight connection of the Low Fare tracks with the Euclid Avenue track of the Cleveland Electric, when Mayor Johnson ordered the cars stopped, is also recited. The petition all through brings the Mayor in as a prime mover in the alleged subterfuges to secure rights for the companies in which he is accused of being interested.

The petition further states that the ordinance granting the use of the Cleveland Electric tracks to the Low Fare Company is illegal, because it purports to give it the right also to operate over a line on East Fourteenth Street which the Forest City Railway Company placed there illegally, because Mayor Johnson is interested in it. Legally, there is a gap between Euclid Avenue and the "graveyard" grant made to the Low Fare Railway Company.

An immediate hearing is not requested in this petition. The company seems to be willing to allow the courts to take their time in hearing the cases it is now instituting, with the evident idea of fighting them through to a finish when once commenced.

Commenting editorially on the situation in Cleveland, the "Leader" says: "It is for the voters of Cleveland to say when and how the deadlock shall be broken. The farther the litigation goes in the courts the worse conditions become. Complications multiply and no way out is charted by the judges. It is a queer monument to the boasted administrative genius and civic patriotism of the 'best Mayor of the best governed city.'"

TRAFFIC ARRANGEMENT ANNOUNCED BETWEEN OHIO LINES

General B. Kerper, president of the Kerper lines, has announced that plans are being made for a traffic arrangement between the Toledo Urban & Interurban and the Columbus, Urbana & Western, including the Columbus, Magnetic Springs & Northern, by which a through service between Columbus and Toledo will be placed in operation. The Toledo, Urban & Interurban extends from Toledo to Findlay. From the latter point an extension will be constructed south 38 miles, to La Rue, which will soon be the northern terminus of the Columbus, Magnetic & Northern. The Columbus, Urbana & Western is now engaged in securing a right-of-way from Columbus to Delaware to connect with the Columbus, Magnetic Springs & Northern.

Preliminary arrangements are being made by the attorneys for the Columbus, Urbana & Western and the Columbus, Magnetic Springs & Northern, which properties are owned by the same interests, for the organization of a new holding company to take over both traction lines and operate them as one system. This will greatly simplify the plans for the through Columbus-Toledo service. It is expected that the new company will be capitalized at \$3,000,000.

The working of extending the Columbus, Magnetic Springs & Northern, north from Magnetic Springs through Richwood to La Rue is well under way. It has been decided to equip the road as a trolley line, but two Strang gasoline electric cars have been ordered to be used in cases of emergency.

The Columbus, Urbana & Western, through W. H. Ogan, its general manager and also the general manager of the Columbus, Magnetic Springs & Northern, is securing a right-of-way up the west bank of the Scioto River from the Columbus municipal storage dam, the present northern terminus of the road to Delaware. It was at first the intention to go up the east bank of the river and bridge at Delaware, but it was found the bridge could be more cheaply constructed and at a better grade below the dam, so it was decided to cross there.

STOCKHOLDERS OF PHILADELPHIA RAPID TRANSIT COMPANY CONFIRM TRACTION AGREEMENT MADE WITH THE CITY

The stockholders of the Philadelphia Rapid Transit Company, at a special meeting, Thursday, July 18, approved the action of the company's officers and directors in ratifying the agreement made with the city for the improvement of existing traction conditions. The shareholders adopted a resolution also providing for a change in section 2 of the company's by-laws, adding three names to the directorate in accordance with the agreement, which requires a representation of the city in the board. The directorate will consist hereafter of eleven members instead of eight, the new directors being Mayor Reyburn, Clarence Wolf and William H. Carpenter.

Later in the day the directors held a special meeting in the Land Title Building, at which the new directors were present, to arrange for the carrying out of one of the provisions of the contract, which stipulates that there shall be stamped across the face of all certificates of stock and leases held by the company notice that they are held subject to the terms of the agreement made with the city, except securities held in the fire insurance fund of the corporation, which may be sold to meet fire losses or for the purpose of reinvestment. This action in stamping the stock certificates makes them subject to the three assessments of \$5 each, which the company will call to make its capital stock full paid. The directors have until August 1 to make a call for the first assessment, payable next December.

REPORT ON RULES

The rules committee of the American Street & Interurban Railway Association has issued the following data sheet with request for reply. It is signed by the committee which consists of E. G. Connette, chairman; E. C. Faber, E. J. Ryon, F. J. Stout, J. N. Shannahan.

"The committee on Standard code of rules submitted a report to the association at the Columbus convention in 1906, in which report were embraced a code of general rules for the government of motormen and conductors of city roads, a code of rules for the government of motormen and conductors applicable to interurban roads, and a code of rules for the government of motormen and conductors applicable to high speed electric railroads. The complete report of the committee is contained in the twenty-fifth (1906) annual report of the association. These rules have also been issued in pamphlet form and sent to the various street railway companies of the country. If you have not a copy of the rules, kindly inform the secretary of the association, who will be pleased to send one to you.

"Before proceeding further, the committee desires to know if the rules contained in the report which was submitted at Columbus have been universally adopted, and if not, to ascertain the reasons for their non-use.

"Will you please advise Mr. B. V. Swenson, secretary of the American Street Railway and Interurban Railway Association, 29 West Thirty-Ninth Street, New York City, whether or not these rules have been adopted on your road. If not adopted, will you kindly give the reasons why and also any other suggestions which may assist the committee in the preparation of its 1907 report.

"You are especially requested to use the enclosed data sheet in replying to this inquiry. The results of this investigation will form a part of the committee's report to be presented at the Atlantic City convention in October. As the time is limited, you will greatly oblige the committee by sending a prompt reply.

1. Company. 2. City. 3. State. 4. Urban or Interurban System?
5. Have you read the report of the standard rules committee which was submitted to the convention at Columbus, Ohio, October, 1906? 6. If so have you adopted these rules as standard on your lines? 7. If you have not adopted these rules as standard, would you kindly give the committee your reasons for not doing so? 8. If you have not read the report of the committee, will you please send for a copy of the report to the secretary of the association? 9. Have you any suggestion for the consideration of the committee relative to the report submitted at Columbus? If you are using a rule book other than that of the association, will you kindly send us a copy? Will you please mark those sections in this book which are not in the association rule book? By so doing you will greatly facilitate the work of the committee. Kindly put additional data and suggestions on a separate sheet and attach it to the data sheet.

PROGRESS ON THE EAST RIVER BRIDGE

In a communication to William R. Willcox, chairman of the Public Service Commission, Bridge Commissioner J. W. Stevenson sets forth the following in regard to the three East River bridges:

"Certain work is in progress on the Williamsburg Bridge, which by the latter part of this year will result in the operation over the bridge of elevated trains. Upon the completion of the terminal, thirty 8-car elevated trains per hour, which can deliver 25,000 people per hour at the Manhattan terminal, may be operated. This traffic is in addition to the present traffic by the trolley cars.

"In the case of the Manhattan Bridge, which will be completed Dec. 31, 1909, provision is made on the structure for eight railway tracks, four on the lower roadway level and four on the upper. Of these tracks the four on the lower level can be used interchangeably for subway, elevated or surface traffic, and the four on the upper level may be used for elevated or surface.

"The track construction on the Blackwell's Island Bridge will provide for the operation of cars over six tracks, two tracks for elevated railway trains, two tracks for surface, and two tracks for either trolley or subway cars. In determining upon the track plans for this bridge, I have tried to find out the intentions of the transportation companies with regard to their operation over the bridge. So far as I am advised, it is not contemplated that use may be made of any of those tracks except one pair for the operation of surface trolley cars. The rapid development of Queens will require in the immediate future more adequate facilities over this bridge than the transportation companies contemplate furnishing."

NEW SINGLE-PHASE RAILWAY IN CALIFORNIA

An interesting electric railway designed for single-phase operation is now under construction between Visalia and Lemon Cove, Cal., by the Visalia Electric Railroad Company. It will be the first single-phase railway in the country to be operated on 15-cycle current. The line extends from Visalia through Exeter to Lemon Cove, a total distance of 23 miles.

The main sub-station from which the road will receive its power is being built at Exeter, approximately the center of the line. Here three-phase, 60-cycle current at 17,500 volts will be received from the transmission system of the Mt. Whitney Power Company and changed by means of two 450-kw motor-generator sets to 11,000-volt 15-cycle single-phase current for transmission to the transformer sub-stations. These latter sub-stations will be three in number, and will be located, one at Exeter and one 3 miles from each end of the road, making the distances between $7\frac{1}{2}$ miles. Each transformer sub-station will contain two 300-kw 15-cycle transformers for stepping the transmission voltage from 11,000 down to the trolley voltage of 3,300 volts.

The pole line will be of the single pole bracket type, and will carry the No. 000 trolley wire by means of a catenary suspension, a 7-16 in. steel messenger cable being used. The 11,000-volt transmission line will be carried on the same poles.

The initial rolling stock equipment will comprise four passenger cars, two of which will be equipped with smoking compartments and one with a baggage compartment. There will also be two trailers, a 50-ton electric locomotive and the standard freight equipment. The current collector will be of the pantograph sliding-contact type. The passenger cars will be provided with a quadruple equipment of 75-hp motors, with multiple-unit control connections and automatic air brakes. A quadruple equipment of 125-hp motors will be installed on the electric locomotive, with the new automatic Westinghouse E.T. air brake equipment. The sub-station and car equipment will be furnished by the Westinghouse Company.

The railway will tap a very rich orange and lemon section at Lemon Cove, and a large freight business in handling these citrus fruits is anticipated. Exeter is a shipping center and Visalia a prosperous commercial center, so that a large passenger traffic will result. The overhead system is nearly completed and work has been started on the power stations. It is expected to have the road in operation in about four months. The officers of the Visalia Electric Railroad Company are as follows: President, W. H. Hammond; vice-president, Ben. M. Maddox; secretary, E. E. Baker; engineer and superintendent, James H. Crossett.

OHIO RAILROAD OVERRULED IN FARE CASE

Judge Bigger, of the Common Pleas Court at Columbus, Ohio, has overruled the State Railroad Commission in its finding against the Hocking Valley Railroad Company in the Price case. Complaint was made to the commission that the company was making a reduction of fares between certain points on the line and not others, and that those who did not receive the lower rates were being discriminated against. The commission decided against the road, but the court holds that a railroad company has a right to make lower fares between certain points in competition. The reduced rates on the Hocking Valley are in the nature of a twin ticket and are operative between Logan and Columbus in competition with the Scioto Valley Traction Company. An injunction has been granted against the commission to prevent its enforcing its ruling.

WORK BEGUN ON BROOKLYN BRIDGE TERMINAL

Ground has been broken in City Hall Park for the erection of the temporary terminal for the Brooklyn Bridge. This is an improvement which it is believed will eliminate many of the disagreeable features of the transit conditions which now exist on the bridge during the rush hour. The plans call for the extension of the present terminal across Park Row into City Hall Park. The extension is designed to provide enough platform space to enable the operation of six-car trains across the bridge. With the installation of the through train service and increased switching facilities by the construction of the temporary terminal, traffic will be distributed, according to the destination of the passengers, and the transferring from the bridge cars to the elevated trains on the Brooklyn side will be entirely eliminated. This improvement will also eliminate the congestion on the Brooklyn terminal during the morning hours, inasmuch as passengers using the elevated lines will be transported to Manhattan without being compelled to change cars. The discontinuance of the cable service will mark a new era in the history of the bridge. The cable has been part of the motive power of the structure ever since it was opened for the transportation of passengers to and from Manhattan.

DETROIT ENJOINED FROM PASSING LOW FARE LAW

On an application by the Guaranty Title & Trust Company, of New York, Federal Judge Swan issued a restraining order July 22 to prevent the city officials of Detroit and the members of the Council from enacting the pending street railway law known as the Hally ordinance. The ordinance provides that the Detroit United Railway can use patches of line on which it is alleged franchises have expired only on condition that the entire line or street on which the patch lies must be operated under conditions calling for the sale of five tickets for 15 cents. The ordinance is avowedly aimed to obtain 3-cent fares throughout the city by using the leverage of the expired franchises. The Guaranty Title & Trust Company, owning \$25,000,000 of Detroit United bonds, charged that the adoption of the ordinance would effect an unreasonable depreciation of the bonds.

REPORT ON CAR HOUSES

The committee on operating and storage car house designs of the American Street and Interurban Railway Engineering Association has issued a call for car house drawings. The letter says:

"The executive committee of the American Street and Interurban Railway Engineering Association desires to have presented at the next convention a report upon car houses, to consist of a compilation of plans and synopsis of specifications of some of the more recent types. This report will illustrate the best practice in this branch of engineering work, and will be of great value to the members of the American Street and Interurban Railway Association in offering data and suggestions for similar work which its members may have to do. To make the report as comprehensive as possible, it is desired to include car houses of the smaller roads as well as those of the largest urban systems in the country.

"The committee requests your assistance in this work, and

asks you to kindly send plans, photographs and descriptions of new car houses, or of any car houses which are of novel construction or possess features of particular interest. The following drawings or photographs are requested: drawing or photograph showing front elevation; plan showing arrangement of tracks, pit room, etc.; cross section showing construction of walls, roof and pits; detail drawings of any features of particular interest; copy of specifications or description of materials used in construction."

The members of the association are requested to send these plans to any one of the members of the committee, who will be glad to acknowledge their receipt, and return such plans as are not used in the report. The committee consists of Fred N. Bushnell, Stone & Webster Engineering Corporation, Boston; N. W. Graburn, master mechanic, Montreal Street Railway Company, Montreal, and R. C. Taylor, superintendent motor power, Indiana Union Traction Company, Anderson, Ind.

STREET RAILWAY PATENTS

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

UNITED STATES PATENTS ISSUED JULY 2, 1907

858,461. Lifeguard for Motor Cars; Benjamin Lcv, Cleveland, Ohio. App. filed Jan. 23, 1907. Details of construction of a car fender.

858,493. Brake-Shoe; William S. Weston, Chicago, Ill. App. filed Nov. 8, 1906. Comprising a body portion of cast metal provided at its back with a connector of tougher metal, from the ends of which shallow inserts of relatively slow-wearing metal project toward the face of the shoe.

858,616. Snow-Plow; James W. Mowbray, Stratford, Ontario, Can. App. filed March 20, 1907. The plow consists of a scoop having vertical cutting knives at the sides thereof, so that the plow will not have to displace snow at the side of the track. The usual converging shares are mounted above the scoop.

858,624. Pleasure Railway; John C. Reckweg, Los Angeles, Cal. App. filed Nov. 1, 1906. The trackways are undulating to cause the car to pitch and roll after the manner of a ship at sea.

858,732. Trolley Pole Controlling Device; William Lile, Venice, Ill. App. filed June 28, 1906. Provides mechanism which will permit the trolley pole to drop away from the trolley wire when the trolley jumps the wire, instead of permitting the pole to swing or fly upward under the tension of the spring which keeps it in contact with the wire under general conditions.

858,774. Reinforced Angle-Bar for Rail Joints; Benjamin Wilhaupter, New York, N. Y. App. filed Oct. 6, 1906. An angle-bar for rail joints, provided intermediate it ends with an offset resilient rail clasp, a pendent stiffening girder and an extended base-supporting shoulder located at the top of the girded.

858,793. Railway Traffic Controlling Apparatus; Clyde J. Coleman, Rockaway, N. J. App. filed Nov. 7, 1904. Relates to detail features of construction of a signaling system employing liquid or compressed carbonic acid gas to actuate the signals.

858,882. Rail Splice; William H. Lewis, Sylvester, Ga. App. filed March 8, 1907. The fish-plates are provided with clamping jaws which engage the base of the rail and a plate thereunder which is spiked to the ties.

858,954. Multiple Valve Device for Air Brakes; Silvio Cire, Jersey City, N. J. App. filed Sept. 18, 1906. A multiple air valve device for use in connection with railway air brake apparatus comprising a casing provided at one end with a train pipe connection and at the opposite end with auxiliary air reservoir and brake cylinder connections, and means for manipulating the brake mechanism by regulation of the intensity of the air supply through the train pipe, so as to enable the operator to control at will the operation of the brakes.

858,973. Anti-Creeper; Henry K. Gilbert, Chicago, Ill. App. filed Nov. 14, 1906. Details of a clip to engage the rail and abut against a tie.

858,983. Tie and Rail Clamp; James B. Hinchman, Denver, Col. App. filed Jan. 23, 1907. Relates to means for securing the rails to composition tie.

859,015. Car Construction; Albert H. Sisson, St. Louis, Mo. App. filed Nov. 15, 1906. Relates more particularly to the construction of the side walls of a car at the locations of the

window openings and also to protective sheathings for the decks of the car at the location of the deck windows.

859,018. Transportation System; Franklin S. Smith, Philadelphia, Pa. App. filed Nov. 21, 1906. Relates to railway or transportation systems in which electrical apparatus is placed along the roadway or track so as to be operative through other apparatus fixed to or carried by a car or vehicle to move the same along the track.

859,019. Electric Transportation System; Franklin S. Smith, Philadelphia, Pa. App. filed March 11, 1907. Relates to modifications of the above.

859,046. Tie Plate; Simon Clary, Carnegie, Pa. App. filed Dec. 11, 1906. Details of construction.

859,056. Rail-Bond; Thomas C. Folsom, Tampa, Fla. App. filed Oct. 23, 1906. Consists in providing a rail-bond which shall be securely held in place in a protected position but which may be readily applied and removed when desired.

859,096. Track Switch; John A. Meredith, Riley, Ind. App. filed March 28, 1907. Relates to the construction of a depressible foot lever for engagement with a switch-throwing arm.

859,182. Rail-Spread Detector for Railway Trains; Joseph A. Shires, Denver, Col. App. filed Feb. 16, 1907. One of the wheel axles is made with a telescoping section and an electric alarm device is arranged to be actuated by the elongation of this axle.

PERSONAL MENTION

MR. F. D. REILLEY, traveling auditor for the Indiana, Columbus & Eastern Railway and the Lima & Toledo Traction Company, has resigned his position to accept a position with a mercantile concern in Detroit.

MR. GEO. G. PORTER, who recently resigned as superintendent of shops of the Metropolitan District Railway Company, of London, England, has returned to this country, and at present is located temporarily in Chicago.

MR. L. W. NEEREAMER, formerly in steam railroad service and recently chief clerk in the office of the Ohio State Dairy and Food Commissioner's office, has accepted a position with the Columbus, Urbana & Western Railway Company.

MR. WM. GIDDES, who recently resigned as master car builder of the Tacoma Railway & Power Company and the Puget Sound Electric Railway Company, has been appointed superintendent of shops of the Portland Railway, Light & Power Company.

MR. F. K. PARKE, who has served the board of supervising traction engineers, of Chicago, as auditor and expert accountant for sometime, has been appointed secretary of the board. Mr. L. R. Acton, who until recently has acted as Western manager for Gunn, Richards Company, public accountants of New York, has been appointed auditor and assistant secretary of the board.

MR. F. A. REUS, formerly connected with the United Railways, of Baltimore, Md., has recently been appointed secretary to Mr. P. F. Sullivan, president of the Boston & Northern and Old Colony Street Railway Companies, to succeed Mr. George J. Anderson, who, as previously noted in the STREET RAILWAY JOURNAL, has become connected with the Electric Bond & Share Company, of New York.

MR. WILLIAM M. IVINS has been appointed special counsel by the Public Service Commission to assist in the investigation of the Interborough-Metropolitan and Brooklyn Rapid Transit systems. Mr. Abel E. Blackmar, another experienced investigator, has been selected as the regular counsel of the Commission. Both of these appointments were announced by Chairman Willcox at the meeting of the Commission, Tuesday, July 23.

IN CONNECTION WITH THE CHANGES announced in personnel of the Cincinnati Northern Traction Company, Mr. C. E. Palmer will have charge of the Cincinnati Northern Division of the company, with headquarters at Hamilton, Ohio, and will have the title of superintendent; and Mr. B. M. Brown will have charge of the Dayton and Richmond Division and the Dayton and Union City Division, with the title of superintendent.

MR. CLINTON WHITE, Railroad Commissioner of Massachusetts, has arrived in England on an inspection tour that is expected to cover six or eight weeks. He will give special attention to the methods and devices for ordering and controlling

crowds in the underground transit lines of London, and will observe similar conditions on the city lines of Paris, Berlin and other large centers. A part of his inquiry will be directed toward the methods of handling freight and heavy-goods traffic in city streets as well as at terminals.

MR. BION J. ARNOLD, chief engineer; MR. HARVEY B. FLEMING, Chicago City Railway, and MR. GEORGE V. WESTON, assistant chief engineer for the city, members of the Board of Supervising Engineers of Chicago tractions, are on an Eastern tour. They will inspect the Pennsylvania Steel Works and the shops of the William Wharton, Jr., Company, at Philadelphia, also the Brill Manufacturing plant and the new subway of the Philadelphia Rapid Transit Company. Later they will visit and inspect the New York subway and the new tunnels.

MR. CLARENCE P. HAYDEN, who has lately been transferred from the superintendency of the eastern division to the full charge of the western division of the New Hampshire Electric Railway, with headquarters at Salem, N. H., was tendered a banquet recently by his associates in the eastern division. Mr. Burbank of the company, in behalf of the employes of the eastern division, with which Mr. Hayden has been connected for a number of years, presented him with a diamond ring as a testimonial of the popular regard for him. Mr. Hector W. McKay succeeds Mr. Hayden as superintendent of the eastern division.

MR. BENJAMIN FRANKLIN HART, of Philadelphia, is dead. Mr. Hart was for many years vice-president of the company operating the Seventeenth and Nineteenth Streets line, and a director of the companies running the Green Street and Fairmount Avenue Railway, the Thirteenth and Fifteenth Streets Railway and the Gray's Ferry Railway, of Philadelphia, now constituents of the Philadelphia Rapid Transit Company. Mr. Hart was born in Hartsville, Bucks County, on March 22, 1825. He was a descendant of the Hart family, who came to this country with William Penn, and who founded the town of Hartsville.

MR. EDGAR PECKHAM'S many friends in this country will regret to learn that in spite of his great energy his English enterprises in which he has been engaged during the last three years have not proved financially successful. The examination of Mr. Peckham's accounts on June 21 in the London bankruptcy court showed liabilities of £4,592, and assets valued as sufficient to yield a surplus of £9 after payment of all debts. Mr. Peckham went to London in 1904, to represent the Peckham Manufacturing Company, of Kingston, N. Y., and remained with that company until its liquidation in May, 1905. In February, 1905, he became interested in a malleable steel casting company in England. During his residence abroad he has also devoted considerable time to inventing and placing on the market improvements in tracks and gears for electric cars.

MR. E. J. COOK, chief engineer of the Cleveland Electric Railway Company, has been chosen as general manager of the Rochester Railway Company, Rochester, N. Y. Mr. Cook has been closely allied with Mr. Andrews in the work of building up the system in Cleveland for a number of years past, and his appointment to the managership of the Rochester system is in recognition of his services at Cleveland. Mr. Cook graduated from the Stevens Institute of Technology, Hoboken, N. J., in 1886, and after being connected with the company in another capacity for some time, was made superintendent of the properties of the Edison Electric Illuminating Company, Brooklyn, in 1889. A year later he became connected with the Field Engineering Company, of New York, as vice-president and constructing engineer, and in 1894 he went to Cleveland, where he spent a year as constructing engineer of the Cleveland Electric Illuminating Company. As constructing engineer of the Detroit Citizens' Electric Railway Company, Mr. Cook planned and superintended the change of the greater part of the system from horse to electric power. From 1896 to 1900 he was electrical engineer of the Cleveland Electric Railway Company, and for three years following this held the same position with the Cleveland City Railway Company, which was then owned largely by Senator Hanna. In 1903 the Cleveland Electric Railway Company and the Cleveland City Railway Company were consolidated and Mr. Cook became chief engineer of the entire system. Mr. Cook at one time made a specialty of constructing power plants. The Cedar Avenue power house of the Cleveland Electric is one of the recent plants he planned and constructed. Mr. Cook will take his work in the new position on Aug. 1. His successor in the Cleveland company has not been chosen.