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Of this issue of the Street Railway Journal 8000 copies are printed. Total circulation for 1907 to date 370,950 copies, an average of 8243 copies per week.

Distribution Copper

That great care is necessary in planning the feeder system for an electric railway is well recognized, yet many operators fail to realize that as much or more care should be taken to see that the distribution copper in use continues to give the greatest possible operating economy. In planning the power distribution system for a new road the distances from power supply, location of grades, weight of car equipment, headway of cars, schedule speed and frequency of stops are all taken into consideration by the engineer. While an attempt is generally made to provide for the fu-

ture to some extent, the designing engineer cannot always accurately forecast conditions as they develop later. The cost of copper also, in many cases, holds the feeder system down to the actual requirements of the present. Consider, moreover, that of the six factors named above as entering into the requirements, only the first two, distance from station and location of grades, remain unchanged, usually, for any length of time. Very few roads continue in operation long with the schedule factors constant. Headway, speed and stops are frequently altered to meet new conditions, and as these changes are made, others relating to the size and weight of the car equipment become necessary.

If such changes result in a great increase in the current required, and consequently in the voltage drop on any particular section, then, of course, the subject of copper is taken up, and enough is added to bring the minimum voltages up to that allowable in the particular case.

The effect of such changes in schedule, etc., as do not immediately result in emphatically bad operating conditions are not as a rule sufficiently studied. As a consequence, after the railway has been in operation for some years, the copper system is likely to become remarkably inefficient, even though the interest on its first cost was once carefully compared with the cost of the distribution losses, as they existed with conditions prevailing at the time it was installed. This state of inefficiency usually comes about gradually, as the number of cars, size of equipments, schedule speed or number of stops slowly increases, or the routing of cars is changed. This may result in steady calls for the distribution copper to carry more and more load, until the losses, increasing so gradually as not to be particularly remarked, become so great that their cost would not only pay good interest on the cost of sufficient additional copper, but yield a handsome profit if it were installed. On the other hand, although occurring more infrequently, changes in operating conditions may have been in the opposite direction, leaving one or more particular circuits with more copper in service than the requirements justify. Often such conditions may be bettered, not by an actual removal of copper from one pole line or circuit to another, but by a judicial interlinking of circuits through tie lines, with circuit breakers and fuses if considered advisable or necessary.

Accurate feeder maps, showing diagrammatically the voltage drop per 100 amps. at every point on the system, are a great help in keeping the distribution system in a state of efficiency. These maps and feeder-loss charts should be studied carefully from time to time as the schedules, etc., are changed, and such study will not fail to reveal changes—oftentimes inexpensive—which will better operating conditions and save operating expenses. In a city system where circuits are divided by section insulators a switch, bridging the insulator through a circuit breaker, may or may not be

advisable—the loss chart will indicate. An additional feeder tap may reduce the voltage drop several per cent on a certain grade; its absence might not be noticed in ordinary operation, but the chart will show that the tap, costing perhaps three dollars, will save ten or twenty dollars per year. Such a chart, kept up to date through the careful checking of installation work on it, will stop the haphazard methods of tapping feeders to the trolley which exist on some roads, largely because of the ignorance of linemen, by bringing feeder-tap locations sharply before the eyes of “one who knows”—but does not always know the conditions which exist.

Too often, when additional feeder copper is required, it is bought and installed without sufficient care being taken with regard to its design in connection with copper already in use. The consolidation of roads also often results in very inefficient use of copper—more often when the load of both is transferred to one power station, but also when both stations continue to operate. Such bad conditions, and others possible but too numerous to attempt to mention, will be prevented or revealed, and the remedy, suggested by complete feeder maps and distribution-loss charts, properly considered with relation to existing and proposed schedules and operating conditions.

The benefits derived from a continual careful watch of the distribution system in connection with the work it has to perform, and the inefficiency resulting from a neglect of these matters, is but additional evidence that good engineering is essential in good operation as well as in good construction.

System and Organization in the Car Maintenance Department

Too many master mechanics are prone to keep themselves down among details rather than to study the work of the shop in a broad way and then to take such steps as may be necessary to secure its systematic conduct. In the very smallest shops where the master mechanic or foreman has probably only half a dozen men under him, there are not enough problems of this kind to demand all the time of one man, and the master mechanic must perforce get into the actual work. But in a shop employing a dozen or more men it is very doubtful if costs are lessened or work expedited when the master mechanic puts on the overalls, gets under a car and stays there with the men several hours at a time. The repairs on that one car may be completed in a shorter time, but work on other cars and in general is likely to be delayed because of the lack of systematic thinking and planning for the future. When a man puts a considerable portion of his time upon the fit of a single bearing, the adjustment of a brush-holder spring or some other as minute detail, everything else is driven out of his brain. A master mechanic who does do this is giving the company a lower grade of work than that for which he is paid, and which is expected of him. If he stays in details because no one else about the shop is able to do the work properly, he is to an extent a failure, otherwise he would get the proper kind of men for the work. This is one of the duties of his position.

There is great need of broad perspective in the shop notwithstanding the fact that some master mechanics may not see the necessity for it. There are so many and varied

operations in the maintenance of equipment that the introduction of a system sometimes seems impossible. But it has been proven time and again that almost every kind of work can be systematized, and results show that the introduction of system, usually lessens confusion, reduces costs and enables work to be gotten out faster.

System for a shop might be defined as an organization of the men and of the work such that the latter will go on just the same in the absence as in the presence of a head. Such an organization requires that every man shall have certain duties to perform and that in the absence of one man another shall take up his work. Further than this, work of a constantly recurring kind shall always be taken care of in the same way. Conditions quite different from this are present in some shops, however.

When a man finishes one job he does nothing until given other work by his superior. When a disabled car comes into the shop every one of the half-dozen or more men who are told to drop other work must be told specifically what they are to do on the disabled car, and further, they must be instructed at every move. No one has specific charge of any one thing with the results that no one can be held definitely responsible for defective work.

Where such conditions prevail it often seems impossible to introduce system and it is impossible to a man who cannot or does not lift himself above details. Often the farther one can get away from the actual work the better the condition of the mind to view it in its entirety, to lose sight of details and to formulate plans for its organization. This probably accounts for the fact that frequently when a large railway system falls into the hands of a financier who never in his life was concerned with the actual details of operation, it is reorganized and systematized to an extent that the old railway management would have considered impossible.

A master mechanic, or other department head as well, who will get completely away from details at frequent intervals, and will view his department in its entirety from a distance, will have some chance of seeing his work and that of his associates from the right perspective. The chances are then that he will see some places where the organization can be improved. He can follow this by taking such steps as are necessary to secure proper order and system in his department, and is certain to be rewarded for his care and trouble by fewer worries and lessened costs in the future, together with that satisfaction which invariably accompanies quicker and more efficient performance.

Some Questions of Overload

There is a healthy tendency to work on standard specifications in electrical machinery and in a general way there have been established, thanks to the efforts of the various societies, rather definite rules of action. The greatest present variations in practice seem to be in the matter of permissible overloads on generators and motors, and in spite of standard rules the subject seems to be rather imperfectly understood. An overload means, or ought to mean, a load that reduces the factor of safety in operative conditions below a conservative value. It may imply overheating in dangerous degree or liability to sparking of a serious character if the machine in question has a commutator. In

any event it is passing beyond the limits of safe continuous operation for one reason or another. Now when, as sometimes happens, a manufacturer guarantees a machine to work continuously at say 25 per cent over its rating, it is pertinent to inquire what he really means. He may imply simply that the generator which he has sold for 1000 kw is really a 1250 kw machine which he has undervalued for purposes of competition, although this hypothesis is improbable. It is far more likely that he believes the insulation is good enough to stand the extra heating in spite of ordinary practice. Every machine may have as many ratings as there are temperatures to be considered, but all ratings above a certain point certainly cut down the factors of safety. The point of maximum heating is the general danger point and no certain means has yet been provided for estimating the temperature at this unknown maximum point.

If the 25 per cent overload does not imply dangerous heating it may imply bad regulation, which is fortunately less serious and more easily detected. The purchaser should in any event know exactly why the 1000-kw generator was not considered as of 1250 kw instead of being regarded as capable of 25 per cent continuous overload. Temporary overload for a given time up to a certain temperature is another matter, and the user can form his own judgment as to the safety of applying it. But permanent overload is a misnomer and deserves investigation. There is a good deal of misconception about the importance of overload capacity anyhow. In a modern station there is seldom need of working much above the conservative rating save for short intervals, and a station which regularly calls for a large overload capacity on its machines is either being carelessly operated or is sinfully underpowered. It is not uncommon to see a railway plant staggering along for years with a steady overload and wailing for public sympathy when it is caught short of power. Operation under such conditions is simply taking unwarrantable chances from a mistaken idea of economy. It is no difficult matter to keep a little ahead of the demand for power and in the long run it is cheaper to keep a spare machine than to stand the increased depreciation of generators which are kept just at the edge of burning out. It is true that traffic grows sometimes at a surprising rate, but a man without imagination enough to look ahead even a single year, erring if must be on the side of safety, has no call to be in the railway business. Railway operation depends only in small measure on the mere costs at the generating station, and a few failures of power damage the receipts all out of proportion to the cost of proper precautions. If we heard more about underload efficiency and less about continuous overloads, superintendents of motive power would breathe easier and breakdowns would be fewer.

Recent Transformer Improvements

The high efficiencies obtained in late years in the operation of large transformers have given rise to an impression that very little improvement is to be expected in transformer design. This is doubtless true as far as efficiency is concerned, but from the standpoints of reduced cost of production, closer regulation and decreased weight per kilowatt, together with cooler operation under load, much remains

to be accomplished. Perhaps the most striking advance in transformer design during the past two years has been that due to the production of special alloyed steel of low watts loss. In a paper on "Modern Lighting Transformers," at the recent meeting of the Canadian Electrical Association, G. P. Cole emphasized this point by comparing in a curve the losses in a special alloyed steel with those in a "normal" transformer steel at 60 cycles. The same considerations of course apply to the power transformers used in railway work. The watts loss per pound was 3.9 against 2.1 at a magnetic density of 25,000 lines per square inch; at 50,000 lines the loss was 12.8 against 6.6; and at 60,000 it was 17.7 watts against 9, all in favor of the alloyed steel at a ratio of nearly two to one.

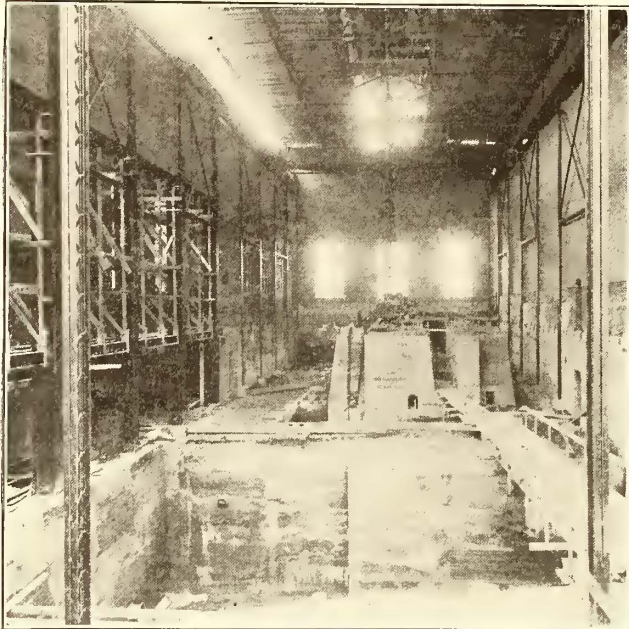
With a lower watts loss in the iron a higher density for the same core loss can be used. This reduces the number of turns in the coils, giving a shorter copper circuit and hence a smaller copper loss. A reduction in the number of turns also enables a greater cross section of copper to be used, improving the regulation, and to some extent the efficiency. The reduction of the number of turns also tends to improve the regulation because in the formula for the reactance voltage of a transformer, the numerator contains the number of primary turns squared.

The question of the aging of iron is not the bugbear it was a few years ago. The results of recent tests show that aging is not apt to result unless the core plates are clamped too tightly and the hysteresis losses allowed to carry the temperature above 80 degs. C. In connection with the disposal of heat the recent practice of impregnating coils with a special compound possessed of high heat-emissive qualities, in comparison with the ordinary treatment with a solvent varnish, has been found to improve the cooling from 20 to 25 per cent. The ordinary cotton covering and fibrous material used in cooling wire and in winding coils sometimes carry 7 to 10 per cent. of moisture. In the usual method of dipping these coils in a cold varnish and afterwards drying the varnish under heat the moisture is sealed in the coil, thus tending to lower the dielectric strength of the wire and cause an ever-present danger of burnouts. The varnish penetrates but a few of the outside layers of the wire, leaving the inside layers of the coil without the reinforced insulation which the varnish is supposed to give the cotton covering. With vacuum-treated coils these conditions are reversed. The moisture is vaporized at a comparatively low temperature, and when withdrawn leaves the coil in the best condition for impregnation. The latter process cements the turns together, giving mechanical protection to them as well as good heat dissipation powers.

Very close regulation is, of course, not as essential in electric railway as in lighting service, but the frequent combination of lighting and power loads on a large scale makes good regulation more and more desirable. If the voltage can be held up with increase of load in railway service the schedules can be held more readily, and the operation of the whole system will be smoother. There is little doubt that the transformer will be an adjunct piece of railway apparatus for many years to come, and every improvement in its design and manufacture will be welcomed by the electric traction fraternity.

THE HOCHELAGA POWER STATION OF THE MONTREAL STREET RAILWAY COMPANY

The Montreal Street Railway Company is having erected at Notre Dame and St. Raymond Streets, in the east or Hochelaga district of Montreal, a direct-current reciprocating engine power plant. This station will serve not only as



VIEW IN ENGINE ROOM, SHOWING CONCRETE FOUNDATIONS

a considerable addition to the power system of the company, but will also be a valuable reserve should there be any failure of the water power transmission. It will help out the St. Denis and Shawinigan water-power substations and eliminate the long feeder lines from the William Street steam station in the western end of city.

THE STRUCTURE

The building as it now stands is large enough to house seven batteries of 1060-hp boilers, but the present installation consists of only five batteries. It will be seen from the plan, however, that the eventual capacity will be twelve batteries; that is, the final structure will consist of sixteen bays instead of ten as now. The power plant then will be 299 ft. 10 ins. long and 153 ft. 9 ins. wide. The present length is 189 ft. 5 ins.

The structure is fireproof throughout, consisting of steel framing and brick walls, except for a temporary wood frame metal covered partition on the end where the extension will be made. The exterior of the station is pressed

brick, while buff brick is used in the engine room, except for an 8-ft. wainscoting of glazed white tile. All foundations are of concrete. The floors are built up of I-beams and reinforced concrete arches. The roof slabs are of cinder concrete covered with slate laid in asphalt and are pitched 1 in. to the foot. Two stacks are provided for in the plans, but only one is now erected. It is of radial brick, 13 ft. in diameter at the top, and extends 225 ft. above the boiler room floor. The foundation for this stack is 33 ft. deep.

The location is on an ancient creek bed and the soil is of a varied nature, consisting in some places of sand, in other places of hard blue clay, and then again of gravel and sand; at one or two places the nature of the soil is similar to quicksand. Considering this condition, it was deemed advisable to provide all the large foundations, such as those for the main building, columns, engine foundations, chimney foundations, etc., with steel re-inforcing rods, laid cross-wise to bond concrete footings thoroughly, and hence tending to lessen the cracking of said footings owing to slight and uneven settlements. All the footings are of such an area that the maximum loads on the soil will not exceed $2\frac{1}{2}$ tons per sq. ft., which, however, is exceeded somewhat in the chimney footings owing to the action of the wind.

The laying of the concrete for the wet wells was a difficult piece of work. The excavation for this work was carried practically 50 ft. below the street level and there was considerable trouble with water, as the soil at this depth is a fine sand mixed with gravel. The footing course of the wet wells was laid after a system of trenches had been provided to carry all water to a sump, the concrete being done



THE HOCHELAGA POWER STATION OF THE MONTREAL STREET RAILWAY COMPANY

in bags. No particular type of re-inforcing was adopted in these heavy walls, but enough steel was placed in them to take care of all the exterior pressures.

The station has three floor levels; the engine and boiler-room floors are on the same level; the corresponding basements are 14 ft. and 15 ft. high, respectively, and the economizer floor, which is 34 ft. above the boiler room level. The engine room is provided with a 50-ton Niles electric traveling crane of 60 ft. span, containing a 10-ton auxiliary hoist.

COAL AND ASH HANDLING

Coal is brought in hopper bottom cars to the station on a track alongside the boiler room, is weighed on a track scale and then delivered through a hopper over the crusher pit. From the latter point the coal is taken by a B. & W. gravity bucket conveyor and delivered to the overhead bunkers in the aisle between the two banks of boilers. This bunker has a storage of 1400 tons, which means a three weeks' supply under present operating conditions. The inside dimensions of the coal bunkers are 22 ft. wide by 101 ft. long.

A heavy cast-iron coal valve is placed over each boiler immediately under coal bunker to control the coal supply to the spout of the stoker hopper. A steel plate cement-lined hopper capable of holding three days' ashes is provided under each boiler furnace. These hoppers are provided with cast-iron valves which are opened to drop the contents into side-dumping steel cars, which in turn discharge their contents into the ash hopper at the lower end of the conveyor whose return is in a trench in the basement floor.

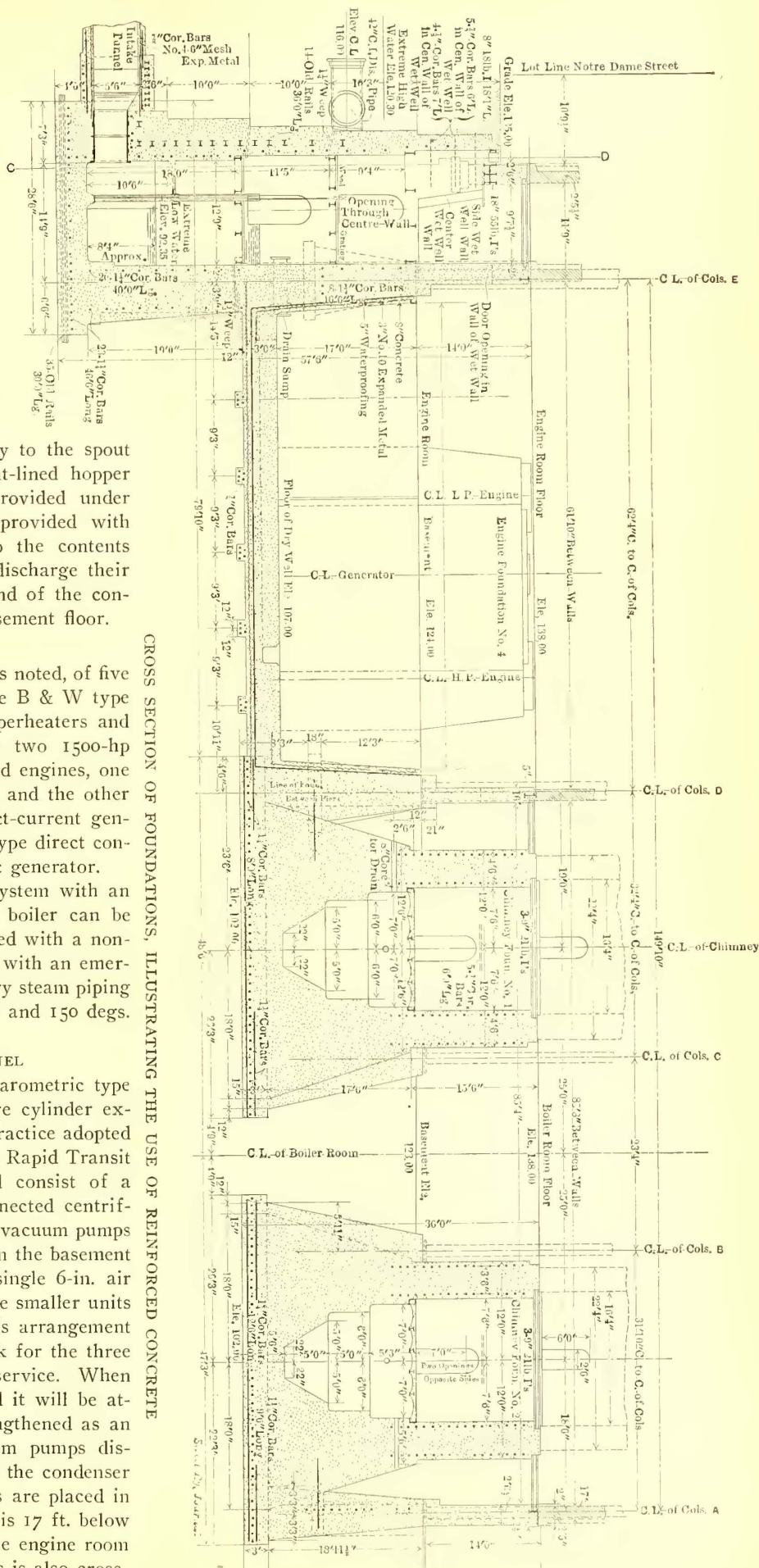
POWER EQUIPMENT

The steam generating equipment consists, as noted, of five 1060-hp water tube boilers. They are of the B & W type and are provided with the same maker's superheaters and chain grate stokers. These boilers supply two 1500-hp McIntosh & Seymour vertical cross-compound engines, one direct-connected to a 1000-kw Westinghouse and the other to a 1000-kw General Electric 550-volt direct-current generator, and one 3000-hp engine of the same type direct connected to a 2000-kw 550-volt General Electric generator.

The main steam piping is a single lead system with an equalizing header, so that steam from any boiler can be passed to any engine. Each boiler is provided with a non-return stop and check valve and each engine with an emergency stop valve. Both the main and auxiliary steam piping are capable of withstanding 250 lbs. pressure and 150 degs. superheat.

CONDENSERS AND DISCHARGE TUNNEL

The condensers are of the Worthington barometric type and are attached directly to the low-pressure cylinder exhaust openings of the engine, following the practice adopted in the Manhattan station of the Interborough Rapid Transit Company. The condensing outfits installed consist of a rotative dry vacuum pump and a direct-connected centrifugal circulating pump for each engine. The vacuum pumps are set alongside of the engine foundations on the basement floor which has a headroom of 14 ft. A single 6-in. air header receives the 4-in. connections from the smaller units and the 6-in. line from the larger one. This arrangement will permit two of the pumps to do the work for the three condensers, should the third pump be out of service. When the second large condensing unit is installed it will be attached to the same header which will be lengthened as an 8-in. diameter connection. The dry vacuum pumps discharge through short direct connections into the condenser discharge tunnel. All of the circulating sets are placed in the dry well or pump pit, the floor of which is 17 ft. below the engine room basement, or 31 ft. below the engine room floor. The piping for the circulating systems is also cross-connected.



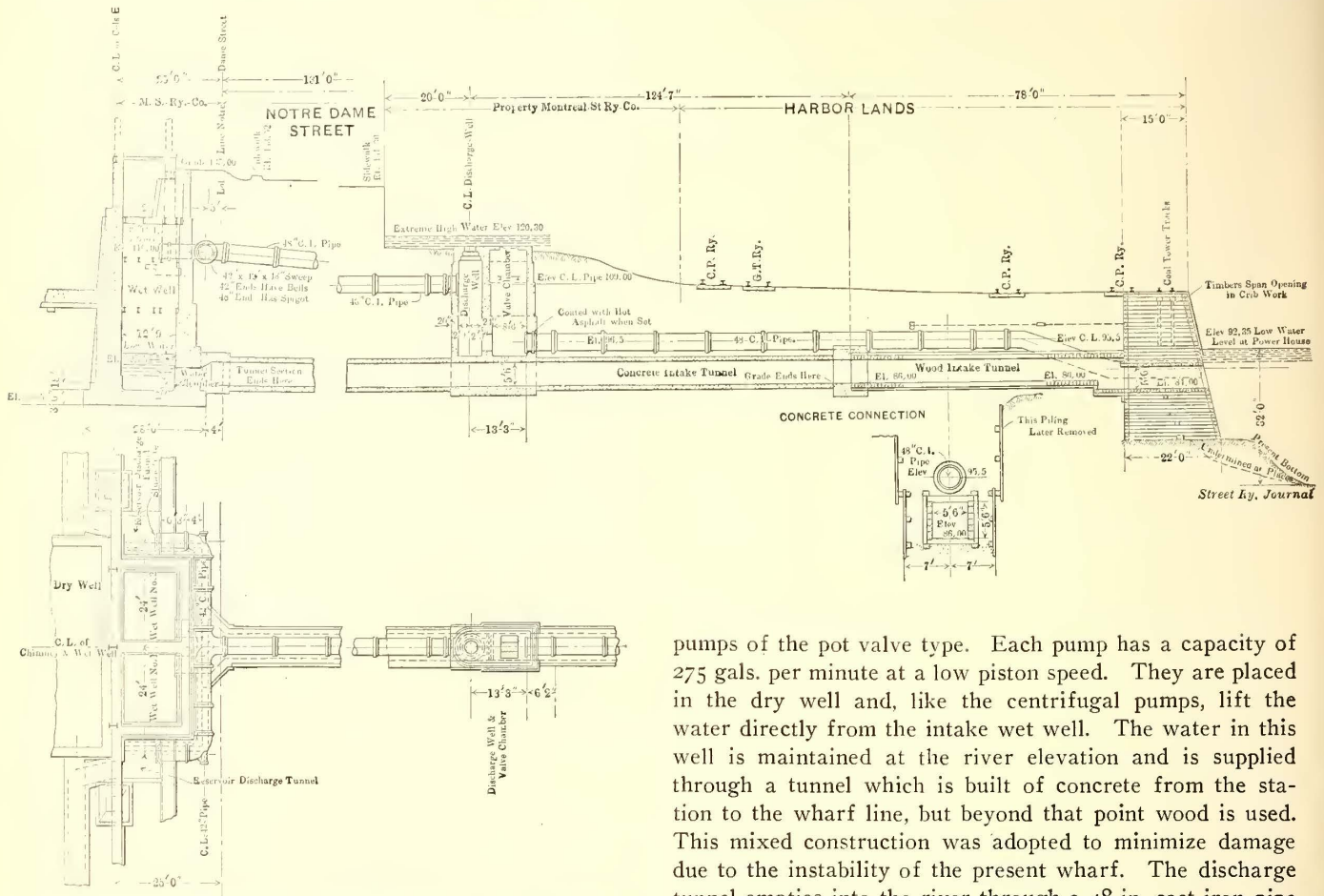
CROSS SECTION OF FOUNDATIONS, ILLUSTRATING THE USE OF REINFORCED CONCRETE

It was originally intended to divide the discharge tunnel, so that the water in the winter could be run some 75 ft. to the up-stream side of the intake tunnel and in the summer some 50 ft. on the down-stream side. For this reason a dividing chamber with valve was required, thus necessitating the concrete man-hole shown in the drawing.

made. The idea of having an up-stream discharge was to guard as much as possible against the action of frazile or anchor ice.

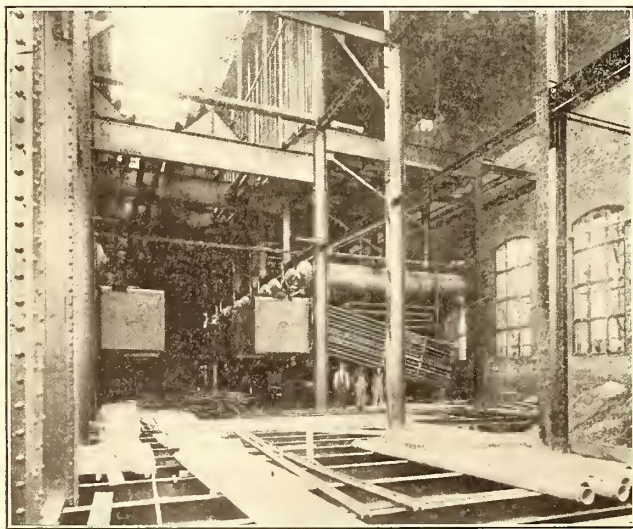
FEED WATER ARRANGEMENTS

The present feed-water pump installation consists of two 16-in. x 8½-in. x 18-in. duplex outside packed plunger

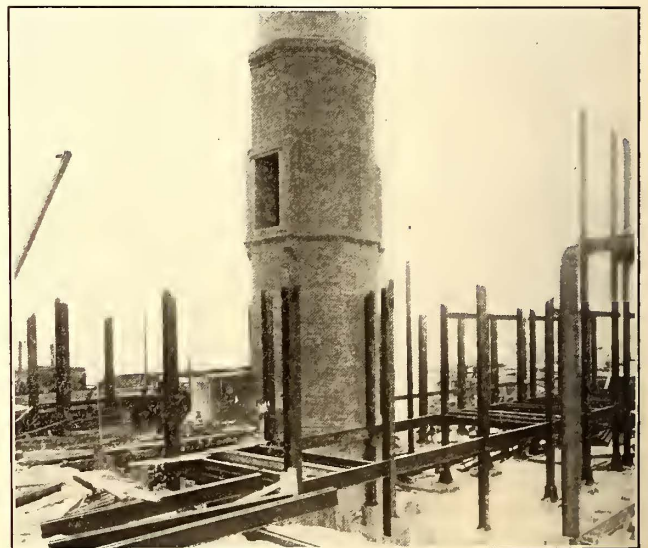


PART PLAN AND SECTION OF DISCHARGE TUNNEL

pumps of the pot valve type. Each pump has a capacity of 275 gals. per minute at a low piston speed. They are placed in the dry well and, like the centrifugal pumps, lift the water directly from the intake wet well. The water in this well is maintained at the river elevation and is supplied through a tunnel which is built of concrete from the station to the wharf line, but beyond that point wood is used. This mixed construction was adopted to minimize damage due to the instability of the present wharf. The discharge tunnel empties into the river through a 48-in. cast-iron pipe



VIEW IN THE BOILER ROOM DURING THE INSTALLATION PERIOD, SHOWING ALSO THE TYPE OF FLOOR SUPPORT



LOWER PART OF STACK

This scheme, however, was abandoned, owing to the fact that the Harbor Commissioners intended to build a new wharf next year, and so the discharge pipe was carried out straight and slightly turned down stream, in which position it will remain until the wharf improvement mentioned is

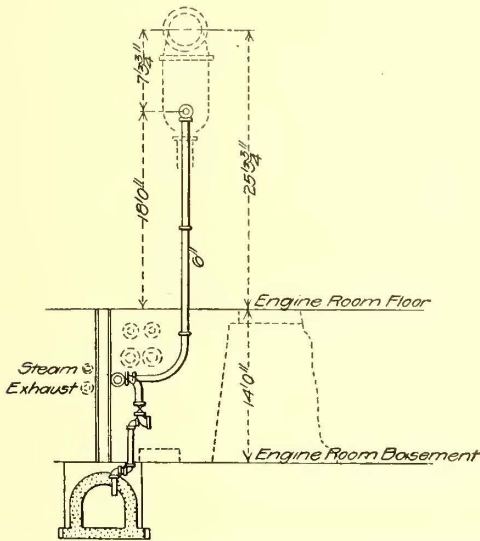
laid to pitch 7 per cent to the limit of the company's property. At the latter point the return drops 12.7 ft. into an intermediate discharge well and then proceeds to the river in two branches.

Each wet well has a pair of counterbalanced screens, so

when one is lifted for cleaning the other is in the water. The feed water heaters are of the Cochrane open type and of 4000-hp capacity each. They are located immediately over the feed pumps, so that the hot water is delivered to the feed pump under a good head and is fed to the boilers under pressure through economizers. The feed water heaters receive their water from taps taken off from the circulating water discharge pipes. They are also provided with an emergency connection for city supply. One float valve controls the feed to both heaters and a second controls the emergency connection, so if for any reason the regular supply from the condenser injection line fails the city water is brought in automatically.

ECONOMIZERS

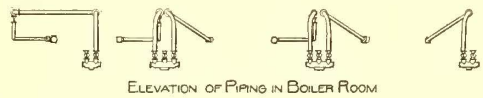
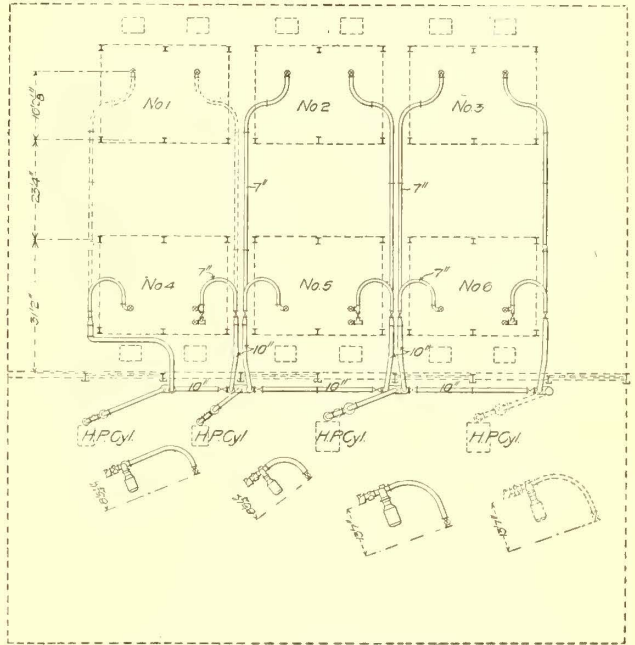
The present economizer installation consists of two 1200-



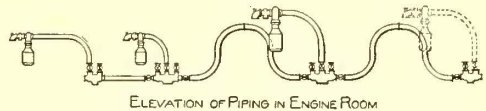
TYPICAL CROSS SECTION, SHOWING DISCHARGE OF DRY VACUUM PUMP INTO CONDENSER DISCHARGE TUNNEL

pipe Green economizers of the double section type with a center wall. One system is placed on the economizer floor immediately over one bank of three batteries and the other

in the uptakes. The economizer scrapers are driven by vertical engines. Each bank of boilers is operated by one damper regulator.



ELEVATION OF PIPING IN BOILER ROOM

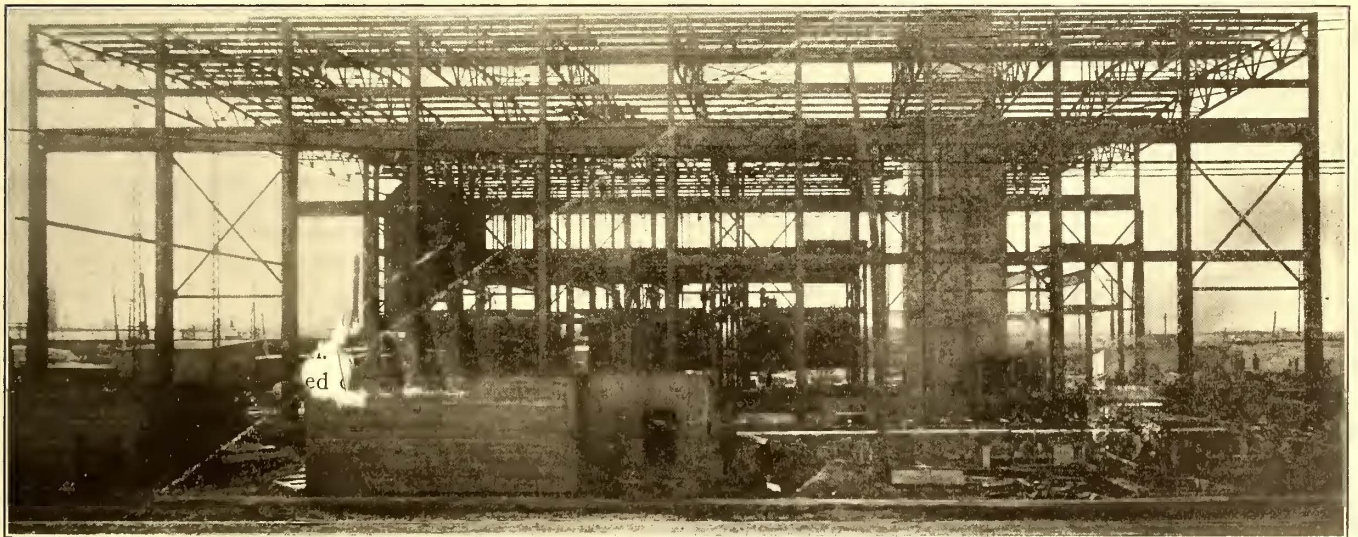


ELEVATION OF PIPING IN ENGINE ROOM

PLAN AND ELEVATIONS OF THE MAIN STEAM PIPING

BLOW-OFF AND EXHAUST PIPING

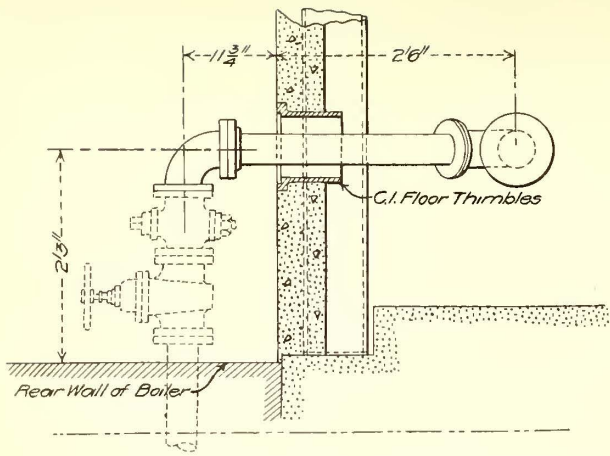
There are two 2 1/2-in. blow-off connections for every boiler leading into a 3-in. blow-off main. This blow-off



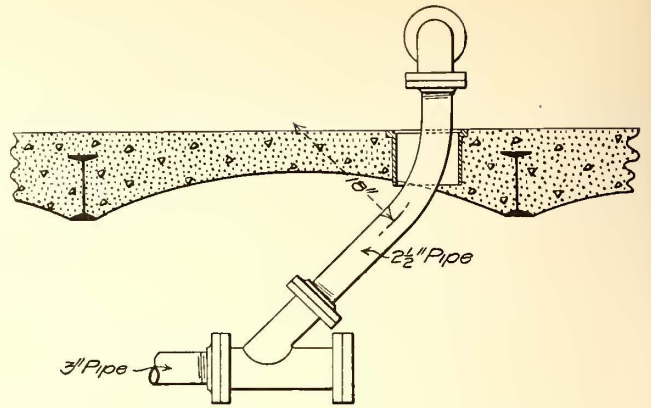
STEEL FRAMEWORK OF THE HOCHELAGA POWER STATION

likewise on the opposite side of the power house. The boilers and economizers are connected to the chimney with a steel flue, the draft being controlled by independent dampers

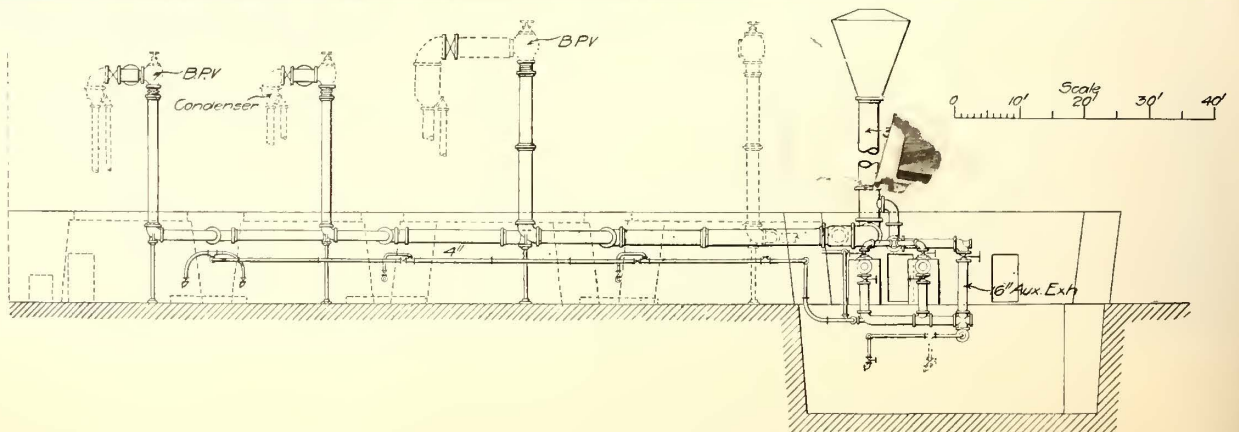
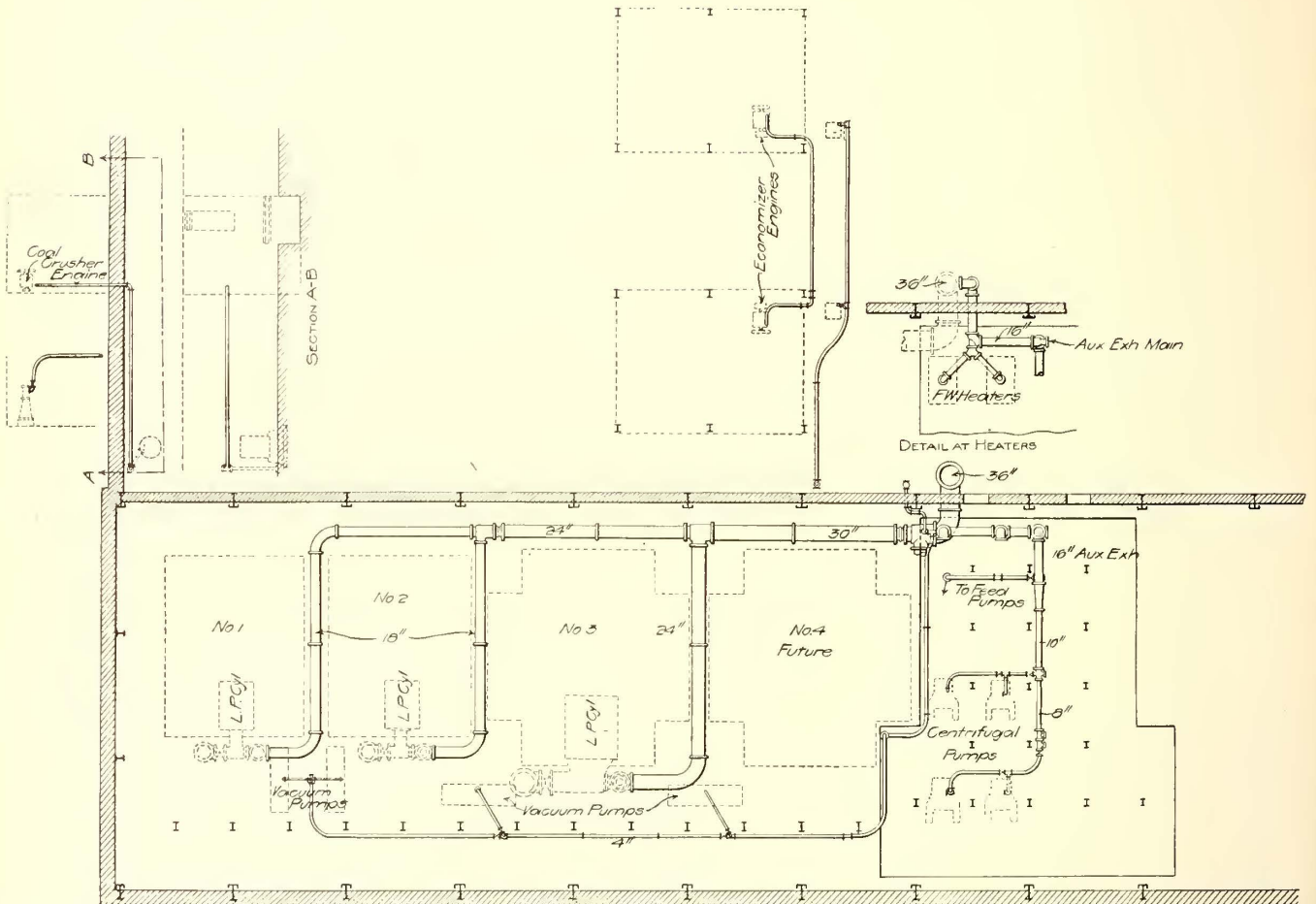
header is hung immediately below the boiler-room floor, and the branches to the boilers extend up through large thimble openings in the floor to allow for expansion and contraction.



ELEVATION OF BOILER BLOW-OFF CONNECTION



SECTION SHOWING BOILER BLOW-OFF CONNECTION



EXHAUST PIPING IN THE MONTREAL STREET RAILWAY COMPANY'S HOCHELAGA STATION

The details of this arrangement are presented in the section and elevation on page 946. Y-fittings are used throughout for this piping.

The exhaust steam from each unit to atmosphere passes through an automatic relief valve and thence through 18-in. and 24-in. pipes respectively to the free exhaust header in the basement, which leads to a 36-in. exhaust head about 16 ft. above the roof. Expansion is provided for by corrugated copper expansion joints of the bellows type. All of the material used for the exhaust piping is suitable for a working pressure of 100 lbs. per square inch. The plan of the exhaust piping is shown on page 946.

SWITCHBOARD

The switchboard is of blue Vermont marble panels and is mounted on a platform over the cable house in line with the main wall, as shown on the plan. Facing the board, and looking from right to left, the panels are as follows: 1000-kw generator; 1000-kw generator; 2000-kw generator; blank for future 2000-kw generator; blank for future booster; twelve feeder panels. Reference to the station plan will show that provision has been made for lengthening the switchboard in symmetry with the other future work.

DESIGN

The station was erected for the Montreal Street Railway Company by the Canadian White Company, Ltd., after the designs of the latter company's mechanical engineer, N. H. Rybitzki. Ralph D. Mershon, of New York and Montreal, was consulting engineer for the power equipment, switchboard and the rearranged feeder system.

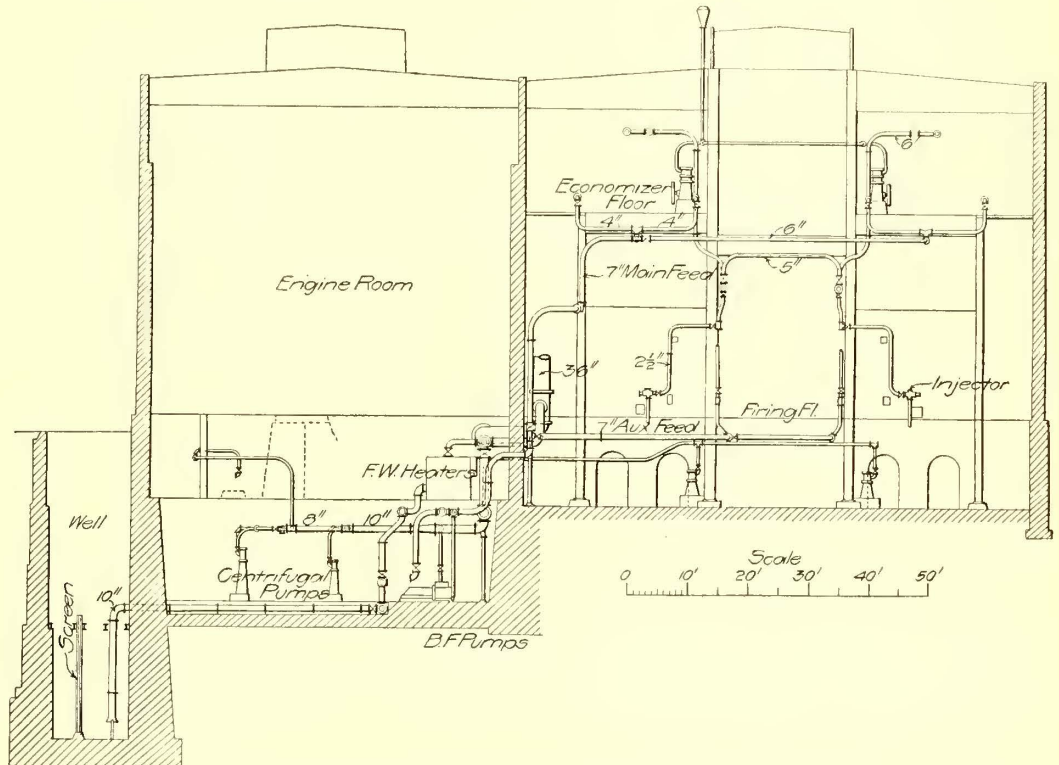
UNION PACIFIC GASOLINE MOTOR CARS

The Union Pacific Railroad has issued a pamphlet descriptive of the thirteen gasoline motor cars constructed by it for service on its suburban lines. All of them are designed for passenger service and twenty-two additional cars are under construction. Car 1 was an experimental car 31 ft. in length, mounted on a single four-wheel truck, with wheels 42 ins. in diameter. The weight of the car was a trifle over 20 tons. It was turned out of the shops of the company at Omaha during March, 1905, and on Aug. 21, 1905, went into regular daily service between Kearney and Callaway.

Car 2 is an all-steel car mounted on two four-wheeled trucks. The two driving wheels are 42 ins. in diameter; the wheels on the trailer truck are 33 ins. in diameter. The car is 55 ft. long, with a seating capacity of fifty-seven, and the total weight is 56,000 lbs. Water from the cylinder

jackets of the engine is used to heat the car in winter. Air brakes are employed and numerous tests at 20 m. p. h. have shown that the car can be stopped in 112 ft. to 115 ft. without inconvenience to the passengers. The car is driven by a 100-hp gasoline engine with six cylinders 8 ins. x 10 ins. of the upright type. Air is used for starting. The car made its initial trip Sept. 14, 1905, and since Oct. 6, 1905, has been in regular service on the line between Kearney and Callaway, making one round trip, or 113 miles, daily.

Car No. 3 is of the same general design as car No. 2, except that it has a baggage compartment. It is now on regular service on the line of the Southern Pacific Company, making a round trip daily between Houston and Galveston.



FEED WATER CONNECTIONS IN THE HOCHELAGA STATION

Car No. 4 is of the same general design and description as car No. 3 and is now in regular service between Kearney and Callaway in conjunction with car No. 2. Cars 5 and 6 are similar in general design to car No. 2; the former is in use on the regular branch line between Loop City and St. Paul, the latter between Leavenworth and Lawrence, Kan. The latter car draws a trailer. Car No. 7 is 55 ft. long and has side entrances and round window sash. Its weight is 58,000 lbs. It is now in service on the Erie Railroad.

The body and trucks of car No. 8 are similar in design to those of car No. 7. It is equipped with a 200-hp motor with 10-in. x 12-in. cylinders. The engine is directly connected to the axle but gears are used in starting. The car weighs 61,000 lbs., but this weight could be reduced to 55,000 lbs. in subsequent cars. It was put in service between Lincoln and Beatrice, Neb., in September, 1906, and is making a round trip daily. Twenty-two cars of this design are now being constructed in the Omaha shops. Car No. 9 is similar in design to cars 2 to 6, but is equipped with a 100-hp engine of special make. Cars 10 to 15 have been placed in service in Denver and have 200-hp motors.

REPORT ON RAIL CORRUGATION, PRESENTED AT THE ELEVENTH ANNUAL MEETING OF THE GERMAN STREET AND INTERURBAN RAILWAY ASSOCIATION

That rail corrugation continues to be a live topic among German electric street railways is apparent from the report on this subject presented by the track committee of the German Street and Interurban Railway Association (Verein Deutscher Strassenbahn und Kleinbahn Verwaltungen) at the eleventh annual meeting of the association held in Mannheim, Germany, Sept. 4, 5 and 6, 1907. The early part of the report describes the well-known features of the phenomenon familiar to readers of the STREET RAILWAY JOURNAL. From the data thus collected the committee concludes that corrugation is not unique to electric railways, its greater prominence in recent times being due rather to heavier wheel pressure, harder braking and other factors increasing the strain on the track.

It is of great interest to learn that the results of two independent German investigations mentioned in this report fail to show the slightest evidence for ascribing cor-

Without considering for the moment the absolute tension values of the track and wheel materials, it is possible to study experimentally this action of the wheel on the rail. Both are of elastic material and hence are not in contact at only one point in a line perpendicular to the rail, but in a plane whose area depends partly on the load and the compression resulting from the elasticity of the material and partly on the shape of the bodies in contact. If it be assumed for the sake of simplicity that the surface of the rail head is level, the molecular distortion of the rail produced by the pressure of the wheel tire will be greater than the actual depression of the wheel, because the molecules of the wheel spread more easily than those of the rail. Usually the wheel and rail, when both are of steel, are of fairly equal hardness, although more recently railway companies have been using hardened tires.

To show this effect graphically, a disc of hard but elastic rubber, Fig. 1, was made to represent the wheel, and two like sized square bars of rubber, one softer than and the other as hard as the wheel, were made to represent the rails. The disc was placed between the bars and then all three pieces were subjected to a uniform pressure between a plate glass disc and a wood disc applied in the direction of a selected diameter of the rubber disc. Fig. 2 is derived from the redrawn photograph shown in Fig. 1. From these experiments the following points are deduced.

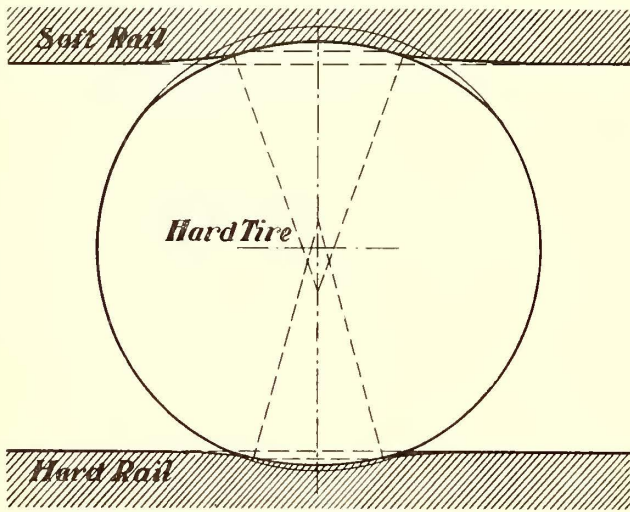


FIG. 1.—EFFECT OF HARD WHEEL ON HARD AND SOFT RAIL

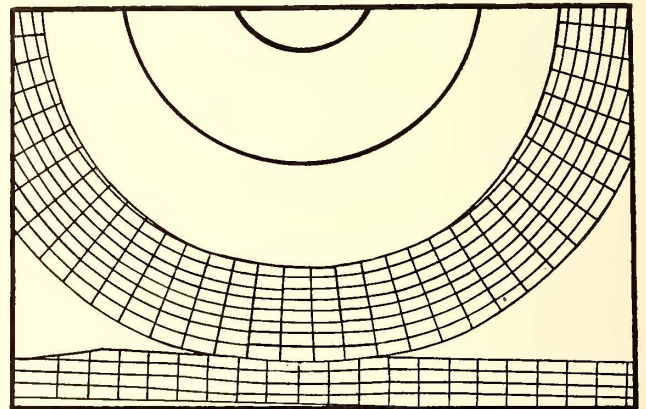


FIG. 2.—RESTING WHEEL

rugation to anything that might occur during the rolling process, thus strikingly confirming the experiments made in this country by George L. Fowler and described by him in the STREET RAILWAY JOURNAL for Oct. 5, 1907.

To be sure, no material is absolutely homogeneous, and it is natural to expect that differences in structure will show up when corrugation occurs, but this does not necessarily imply that these differences are the cause of this appearance.

On examining the corrugations it is found that the material in the head of the rail and the depressions caused by the corrugations are disposed toward the groove rather than the outer side of the rail, hence the committee concludes that the corrugations are formed only when the action of the wheels is such as to cause a displacement of the rail material. Changes of this kind cannot occur, however, unless the wheel pressures are greater than the elastic limit of the rail. This does not mean that every individual wheel pressure need exceed the elastic limit of the rail, but that after the wheel has passed the particles do not return to exactly their original position. The sum of these small displacement increments results in corrugation. It is noted that this process of accretion is as gradual as the development of the effects of corrugation.

In both cases the flattening of the disc is less than the corresponding depression in the rail head. These elastic changes in form are not confined to the contact surfaces but spread beyond, especially in the softer rail. A longitudinal section taken through the contact surfaces shows on each side a curve which may be considered a circular arc, both of practically equal radius but greater than the radius of the wheel. Further, the wheel causes a deeper depression in the soft rail than in the hard one, and consequently the contact area and strains are greater in the soft rail, but the pressure per unit area is less. Referring again to Fig. 2, it will be noted that several lines were drawn both on the wheel and rail to show the amount of distortion that takes place. In this case the wheel is at rest and the contact surfaces and strains are symmetrically distributed on each side of a perpendicular line drawn through the axle.

The conditions, however, are very different once the wheel is in motion, even though this experiment does not permit an application of all the forces that occur in a wheel on the car. In the latter case the wheels, which themselves are somewhat elastic, are rigidly fastened to axles also possessing elasticity, and besides this, one pair of wheels receives the torque of the motor direct while

the others are trailers. The experiment, therefore, must be confined to a pure rolling motion combined with minor sliding movements.

Let it be supposed that the wheel, shown in Figs. 1 and 2, moves toward the right, as indicated by the arrow (see Fig. 3). Now if its movement is for an infinitely small period, an infinitesimal turning movement of the entire wheel about the point *A* may be substituted for the rolling motion. It then becomes clear at once that all points on the circumference to the left of *A* must have an upward movement and all points on the right a downward movement. One set of points, therefore, is adding load and the other losing load in proportion to the distance from *A*. From this it follows that the pressure resultants of the rail surfaces no longer will be at *A*, as in the case when the wheel is at rest, but they will pass through a point on the right which can also be obtained by finding the resultants of the wheel pressure and the horizontal force driving the car forward. It is easy to find the approximate course of the curve in this instance through the knowledge gained through a study of the longitudinal section of the contact surfaces shown in Fig. 2. It must form part of a parabolic curve of such type that *c* is the largest and *b* the

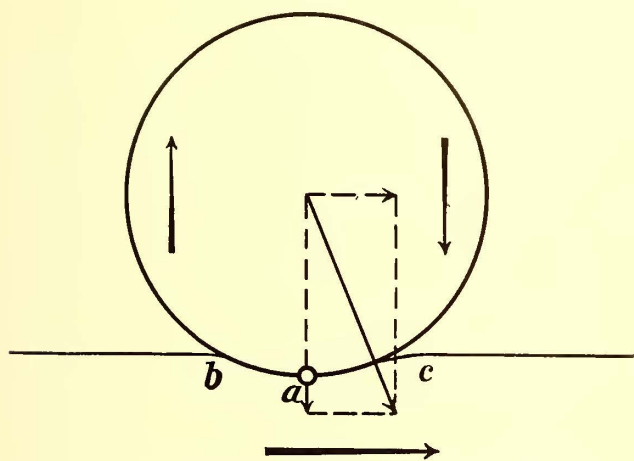


FIG. 3.—DIAGRAM OF WHEEL AND RAIL RESULTANTS

smallest radius of curvature, which almost corresponds with the radius of the wheel.

To secure experimental verification of the foregoing, the model wheel was turned and instantaneously photographed. The result, which is shown in enlarged form in Fig. 4, proves what has been said about the shape of the curve of contact. The same form is shown by the longitudinal section of actual corrugations.

Besides the pure rolling movement the average car wheel also slides occasionally, notably during the period of maximum braking, when the kinetic energy of the car pushes it forward. In this case there is no longer any difficulty in conceiving the appearance of the contact curve. Owing to the horizontal reaction of the rail material a pressure is produced on the front half of the wheel tire which is grasping the rail so much as to tend to flatten it. The curve, therefore, corresponds to the one for the stationary wheel, except that the branch on the right has greater radii of curvature, hence in general it resembles the rolling wheel. This is confirmed by Fig. 5, which shows even better than Fig. 4 that the material in the rail head is pushed forward by the wheel which strongly compresses it and forces the material to rise upward.

Of course between the curves given there is a series of variations differing in accordance to the relative propor-

tion of rolling and sliding, but in general all of these curves are similar.

For the sake of simplicity only the longitudinal distortion has been considered, but naturally the gripping depth of the wheel depends also on the width of the contact surfaces, for the smaller the one factor the higher must be the other. The impression made by the wheel on the rail head is elastic and changes its position with the wheel.

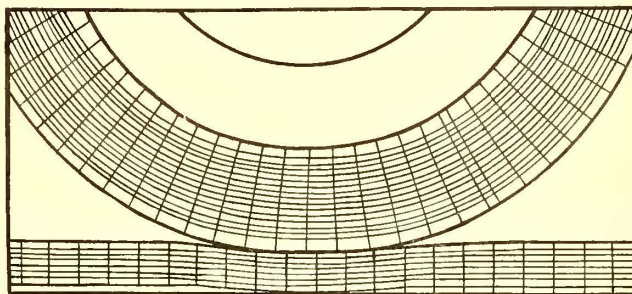


FIG. 4.—ROLLING WHEEL

Hence the rolling of a wheel over a rail originates on the head a progressive wave movement, or, in other words, molecular vibrations are generated both transversely and longitudinally. The first can last but a brief time, for even at hollow spots in the rail the wheel load tends to crush such spots and thus break up transverse movements, while the longitudinal movements continue for a long period as can easily be learned by placing one's hand on the rail after a car has passed. These longitudinal vibrations are the cause of the noise made by cars on both tangent and curved track.

Although this musical side of the theory of rolling friction is of little interest here, the vibrations which cause the noise must be considered and have already been referred to elsewhere. Those mentioned previously, however, were intended to relate to causes independent of the mutual action of the metals in contact. Both result in the same reactions in the rail and it is hard to keep them apart. It appears, however, that in some cases these disturbances from diverse causes are superimposed and at other times counteract each other.

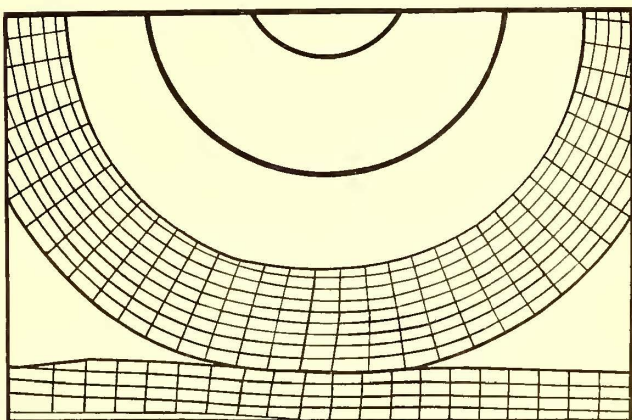


FIG. 5.—SLIDING WHEEL

In this connection it may be said that the kind of motive power and the equipment required by it cause certain oscillations which may have some influence in forming corrugations, but they cannot be the fundamental cause. The corrugations do not result directly from the vibrations, but from the stresses in the rail set up by them. Just as transverse and longitudinal waves cannot appear independently, pressure and tensile stresses cannot be con-

sidered by themselves alone, no matter how accustomed we may be to treat them separately. Figs. 1 to 5 show very well that appreciable tensile stresses appear also in the rail head beside those caused by the pressure, and hence both cause deformation.

The tensile stresses are increased by rolling friction due to the moving of the wheel over the rail. With a rolling wheel there is a tendency to push the rail particles in a direction opposite to the wheel movement, and there is a similar tendency when the wheel is braked. Hence it is easy to conceive how valleys would be formed between these crests. Now in reality the wheel really never has a pure rolling motion because there is always a certain amount of sliding. Such sliding is not necessarily due to braking alone, but may arise from other causes, such as the unequal diameters of wheels on the same axle, unsymmetrical wheel tires and rail heads, a torsional twisting of the wheels owing to their unsymmetrical drive from one side, the changing resistance of the rails which are never in a true plane, and the unequal distances traveled by opposite wheels on the same axle, as is the case on all curves.

Hence, as a rule, this additional strain in the rail must be produced in a direction the same as, or opposite to, that of the wheel movement. If the conditions are such that the sum of the tensile stresses (whose direction naturally must not only be supposed to be parallel to the rail, but also normal to it) approaches the elastic limit of the rail structure or exceeds it, a permanent lengthening of certain fibers of the rail material must result. The material flows away equally on each side, is pushed forward by the wheel and at the same time compressed. The compression will continue until the producing force, which varies in amount on account of the axle torsion, is no longer large enough to cause further compression. The result of this compression is the formation of a gradually higher corrugation crest, from which the movement is repeated and further corrugations generated. Their length and depth must remain within the limits set by the wheel diameter and the differences of material in relation to the acting forces, which we may conceive as consisting of the weight on the wheel and the force driving the vehicle forward.

So aside from all differences in the rail material, which in themselves are sufficient to cause variations in wave length and depth, the latter will be fixed principally by the forces mentioned. It is clear that in operating with single cars the corrugations in general will appear as short waves, but on the other hand will increase in length with the increase in the kinetic energy applied per individual wheel because where there are many wheels, as in a train, the particles are pushed ahead much faster than they can return to their original position. Now as the kinetic energy of a braked train constantly decreases, the corrugations so caused will show this fact by their unequal wave length, the first corrugations being the longest and the later ones decreasing gradually, in correspondence with the diminution of braking effort applied. It remains to be seen, however, whether the wave lengths decrease in exactly the same ratio.

Thoroughly to understand the events which take place, it is necessary to compare again the movement of the elastic waves of the particles of the rail head in the case of a pure rolling wheel and a pure sliding wheel. It should be understood, however, that in operation we must deal with pairs of wheels connected by elastic axles subject to torsion, a condition which of course cannot be

carried out in the disc experiment. In the first case the distance covered on the rail corresponds exactly to the sum of wheel perimeters, and the wave can always run backward without hindrance. With a sliding wheel, however, matters are entirely different, for the waves cannot return without opposition, owing to the steady resistance due to sliding friction at the contact area. But as the wave must go back eventually, the compression caused by the wheel pressure must be so great as to overcome even the resistance due to friction. Once this value is reached the compression wave moves backward as suddenly as a loosened spring, an action which is followed by the other waves until the car or train has come to a stop. Every action of this kind is accompanied by a shock easily perceptible on the car, the wheels of which are braked so hard as to be unable to turn. As the kinetic energy of the car is gradually diminished by braking, the compression and consequently the shock is diminished. From this it is seen that according to the circumstances under which braking occurs there must be considerable tension in the material of the rail head, from which there can be no doubt that, aside from harder wheel tires, the prime cause of corrugation arises from the sliding or braking of the wheels.

The prominence of corrugations on flat curves is now clear without further evidence, for on them there is a sliding of the wheels even without braking. This effect increases with the speed because the rail molecules cannot adjust themselves to the change quickly enough. The frequency of the corrugations will be greater first on the outer rail and then perhaps on the inner rail—possibly in most cases on the side less loaded, where the wheels take the lead and thus prevent sliding. Hence it happens that the smooth rolling on one rail produces no corrugation, while the other, with its combination of rolling and sliding, is corrugated. In Hamburg corrugation occurs mostly on the outer rail of curves between 150 and 300 meters radius.

Nothing has been said regarding the braking streaks produced in the rail when the wheel slides, yet these markings would appear suitable guides to the molecular effect produced. It may therefore be of interest to say something in regard to them. On the spots where the braking of the cars usually occurs there are, as a rule, one or more clearly defined streaks which indicate the direction of braking and apparently mark out the places of maximum pressure between the contact surfaces. Less attention, however, appears to have been given to the fact that along these lines, though sometimes isolated, there will be found occasionally short streaks whose length and intervals correspond with those of the corrugations. They are about 3 mm ($\frac{1}{8}$ in.) wide and 5 to 10 mm (0.2 to 0.4 in.) long. Sometimes they appear as single dotted lines, but at other times will be found in groups similar to the corrugation. They appear in exactly the same way on rails which have remained free from corrugation, but which lie opposite rails thus affected. From this it would appear as if they had the same origin as corrugation or else that the opposite corrugated rail had produced on the unaffected rail an effect similar to braking. Coupling this observation with the fact that these streaks are variable, we must conclude that they are caused by the braked wheels, in which also the after-push of the trailer or unbraked wheels against the motor-driven wheels may be considered a braking action. Only in one case dotted braking streaks were observed which had a width of 3 mm and an average

interval of 48.33 mm (1.90 ins.). These dotted braking streaks also must show the places of highest pressure. They are intermittent because, as already noted, the elastic waves arising when the wheel is braked are not continuous, but recoil like a spring. In such places, where a large number occur in a series, a cross section is given of the waves under tension from which conclusion regarding their length may be drawn.

In considering this explanation it may seem ridiculous at first to assert that the same wheel pressure should cause corrugations in one place and none in another, but it must be remembered that it is not the loads alone that cause corrugation, but principally the conditions already considered. It may, therefore, be of use to mention a similar phenomenon where familiarity prevents us from seeing anything paradoxical.

For instance, when in a lathe or drill a dull tool works with a given pressure and then is replaced by a sharper tool, but which has the same hardness as the material worked, it is known that no cutting will result. To secure such an effect it is essential that the tool steel should be harder and at the same time sharp or pointed, for the main thing is that it must penetrate into the material just as in any case the wear of two impinging surfaces can take place only when the molecules of one fit into interstices in the other. A wheel running on a rail, especially when it is very hard and is braked, is comparable with tool steel except that being round the least possible amount of work will be done.

No important differences can be found in the hardness of the rails at the corrugated places by tests made with steel balls. Differences in hardness could occur only where the corrugations are not fully developed. Once developed there must be a balance between the material and the external forces, from which an equal hardness would result throughout the surface of the rail head. A deepening of the valley in a fully corrugated rail is conceivable only in cases caused by hammering or falling of the wheels, which occasionally occur and may, for convenience, be termed secondary corrugations. In general, however, when the final state of corrugation is reached, the wheel cannot cause further strains exceeding the elastic limit, but is more likely to wear down the corrugations in proportion to the increase in speed.

In conclusion it may be said definitely that corrugations are caused when the surface on the rail material is acted upon by the wheels under such conditions that the tensions created in it reach a value approximating or equaling the elastic limit of the rail material. This condition can occur under the following circumstances:

(1) When the wheel tire is harder than the rail head.

(2) Through sliding wheels caused by quick intensive braking, by too sudden application of power in starting, by slipping in curves, by an unsymmetrical drive which transmits the torque unequally between the pair of wheels on the same axle, unequal diameters of wheels on the same axle, undesirable sections of tire and rail head, unequally worn wheel tires, inequalities in hardness of the rail head, etc.

(3) Through any favorable combination of the foregoing, even when any single cause would not be sufficient to effect corrugation; through further combinations with vibrations, increased speeds, increased wheel pressure and too small contact surface between the wheel and the rail on account of undesirable cross sections.

The same results are reached in the following manner:

Since the corrugations have appeared only within a fairly definite period or else were previously unknown, they must have been due to novel factors in operation within that period. That this is so appears from the following list of new factors in electric railway operation:

(1) The physical changes in rails and wheels, but especially the relatively great increase in hardness of the latter.

(2) Introduction of power braking and consequent higher braking effort.

(3) Increase in pressure on the rail per wheel, particularly of the part not flexibly supported.

(4) Increase of speed.

A practical demonstration may be given with regard to the physical changes in wheels and rails. Electric railway service in Hamburg was commenced about 1894, but at first the old wheel tires which were as hard as the rails (tensile strength of 60-65 kg. per sq. mm). No corrugation occurred. In 1896 harder wheel tires (92 kg. per sq. mm) were introduced and corrugations appeared as rapidly as the new wheels were introduced. Not only did they occur on the new rails, but also on old ones which through years of service had never shown this phenomenon before. In one instance a change from steam railroad operation with soft tire wheels to electric service with hard tire wheels on one of the old lines quickly produced corrugation.

PANTOGRAPH COLLECTOR FOR HIGH SPEED ELECTRIC RAILWAYS

BY JOSEPH MAYER.

The contact wire which forms the track for the sliding bow used on high speed single-phase railways is suspended either at short or long intervals. In the former case the weight of one-half span of contact wire is generally much less than the upward pressure of the sliding bow and is called the contact pressure. The wire is therefore bent up by the bow beyond the supports. In the latter case the wire of one half span weighs more than the amount of the contact pressure. It is lifted by the bow from its normal sag, but to a position still below the horizontal between the two supports. In both cases the bow moves along vertical curves. At high speeds this produces a considerable amount of centrifugal force which, according to its up or down direction, increases or reduces the contact pressure. The increase should not be so large as to produce dangerous bending strains in the wire; the reduction should not be so large as to cause separation of the bow from the wire and consequent sparking.

The centrifugal force of the bow and its supporting frame is proportioned to the weights of the parts which move in curves and to the square of their speed, and is inversely proportional to the radii of curvature of their motion. It is therefore evident that it is large in bows, having a heavy supporting frame which has to follow exactly the motion of the bow where the latter moves along curves of short radius. Such bows are impracticable at high speeds. Various methods have been employed for obtaining a reduction of the centrifugal force; all have this in common that springs are introduced between the contact point and the heavier parts of the frame. The bow itself may be made of spring steel so that only the parts near the contact point closely follow the motion of the latter. One difficulty with this design is the low conductivity of spring steel and the large cross section required with the largest currents supplied to electric locomotives, but it may be practicable with the moderate currents needed with very

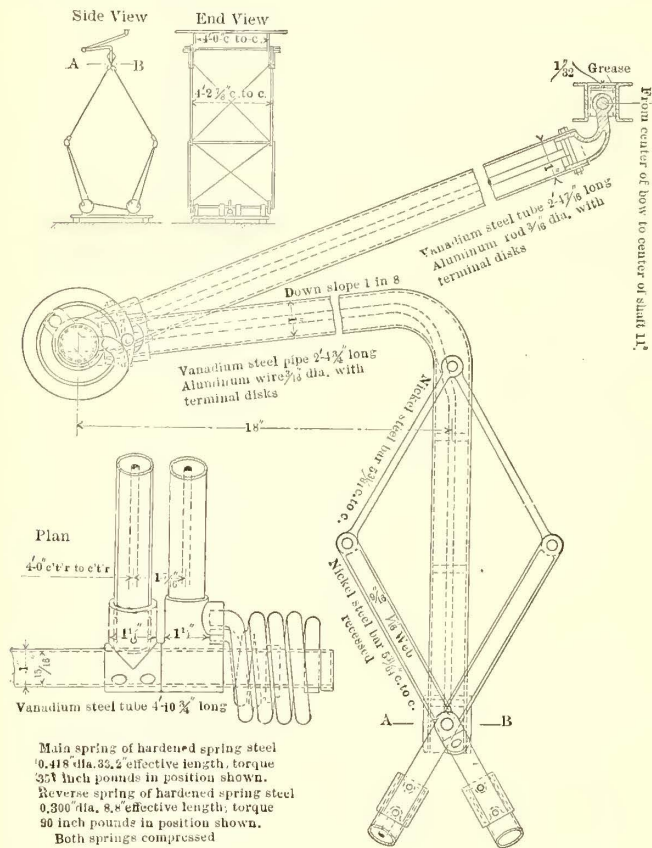
high voltage. This spring bow may be carried on an ordinary diamond frame or on two long trolley poles, or it may be supported by means of additional springs inserted between it and the heavier parts of one of the various forms of frames.

The design here illustrated and invented by the author of this article uses an aluminum bow carried by light tubular radial arms which by swinging around a shaft give the

easy motion of the bow caused by the wind pressure. The frame below the radial arms must, in this design, produce during its uniform upward motion a contact pressure of 15 lbs. and one of not over 19 lbs. during its uniform downward motion.

When the direction of motion of the sliding bow, along a wire hung with long spans and considerable deflection is changed at a suspender, from an upward to a downward slope, only the light bow and the radial arms quickly turn down, the compression in the main springs and consequently the contact pressure rapidly increase by a calculated safe amount. The heavy frame at first continues to move up, but with a retarded motion; it soon comes to a stop and begins to move down with an accelerated motion. The radial arms then turn up again, the contact pressure decreases and the downward motion of the frame is gradually stopped; it then begins to move up again. After a few oscillations the swinging of the radial arms ceases by the friction, the frame falling and rising then together with the bow. With the design here shown the contact pressure is not materially affected by the wind pressure or by the forward or backward direction of the radial arms. The needed length of the radial arms depends on the kind of suspension of the contact wire, on the size of wire and on the train speed.

The illustration shows a bow calculated for a 600-B and S-gage wire hung by the saddle suspension with 220 ft. spans and 4 ft. maximum vertical deflection, with a maximum train speed of 50 m. p. h. By using smaller deflections of the wire with 200 ft. spans and shorter sliding bows speeds of 80 m. p. h. can be provided for.



Street Railway Journal

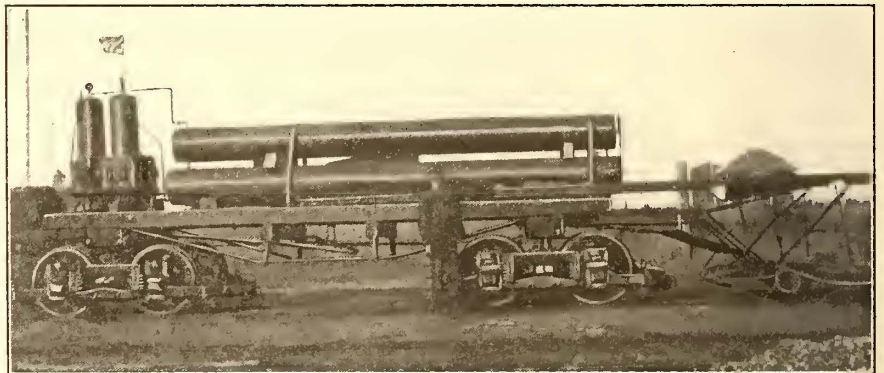
DETAIL OF PANTOGRAPH COLLECTOR

bow an adequate range of vertical motion independent of the heavy frame below. The springs are between the shaft and the frame. The wind pressure on the bow and arms, due to a strong head wind and high train speed, turns the radial arms down if they point backward and up if they point forward. In the first case the remaining range of downward, in the later that of upward, motion is decreased. To reduce the effect of the wind pressure on the position of the arms reverse springs are introduced. The arms are firmly bolted to the shaft and are pressed up against the wire by the main springs, which are under compression and are attached to the shaft and the bent tubes carrying it. The reverse springs are only active during the upper part of the range of motion of the arms. They are so attached that they push the arms down and cease to act after a certain position is reached. They are also under compression and have the same stiffness as the main springs, they are smaller because exposed to less strain. Any change in the torque transmitted to the springs by the radial arms results in only half as much turning of them within the range of action of the reverse springs as outside of it. This halves the reduction in the range of

A WEED BURNER

BY C. L. GREER

The Northern Texas Traction Company operates an interurban line thirty-five miles in length between Fort Worth and Dallas, in the State of Texas. Much of the country traversed has a heavy growth of weeds and grass, necessitating the expenditure of considerable labor to keep the track clean. For almost the entire distance the track and right of way is covered by a grass, known locally as "Johnson grass." This grass is very tenacious and is kept down



SIDE VIEW OF WEED BURNER

only with great difficulty. As the roadbed is of crushed rock for most of the distance it was practically impossible to remove the weeds by cutting them off at the surface of the earth. After vainly trying other methods of overcoming the trouble the company constructed the weed burner shown in the accompanying engravings. The burner is mounted on a flat car and is slowly run over the track, while the flames from the burners destroy the vegetation below. The oil for the burners is common crude fuel oil.

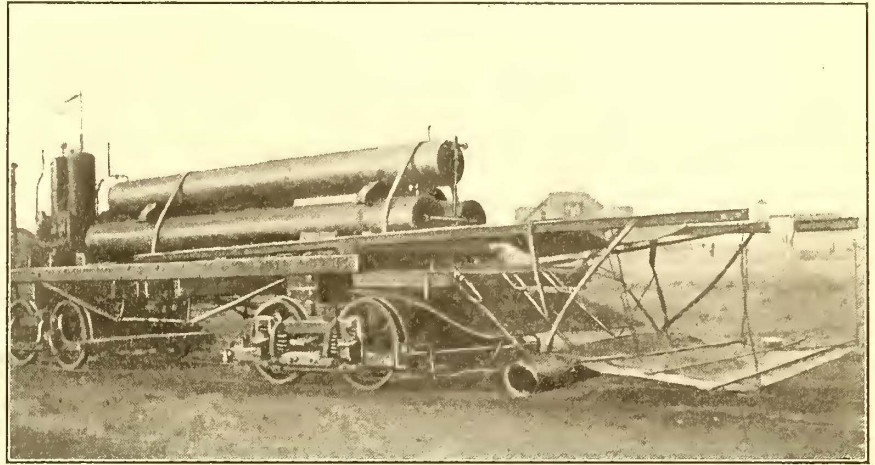
The outfit consists of a motor-driven air compressor, two air reservoirs, three oil reservoirs and four burners, together with the necessary valves and fittings. There are two air pipes, one to put pressure on the oil in the oil reservoirs and the other to furnish a jet of air to break the oil into a spray at the burners.

It will be noticed from the plan, Fig. 2, that the oil pipe from each oil reservoir is tapped into a pipe from the air reservoir, and this pipe is lead to a header from which the burners are fed with oil. It will also be noticed that the air for spraying the oil is brought to the burners in pipes which pass at their lower ends inside the oil pipes and terminate at the burners. The flame from the burners is directed downward and outward by the shield and split pipe shown. The latter is carried just above and at right angles to the track. It is a section of 10-in. pipe containing on one side holes to receive the burners and on the other side a 6-in. slot reaching its entire length, or nearly so. It is through this slot that the flames from the burners pass to the track below. Just above the burners is a large sheet iron shield which holds the heat and flame down to the track and prevents any serious disturbance of its position by the wind. On top of each oil reservoir is a small release valve to remove

a plan or top view, and Fig. 3 shows a detail drawing of the burner, which is made of a common ell with a hack saw slit in it and one end plugged up.

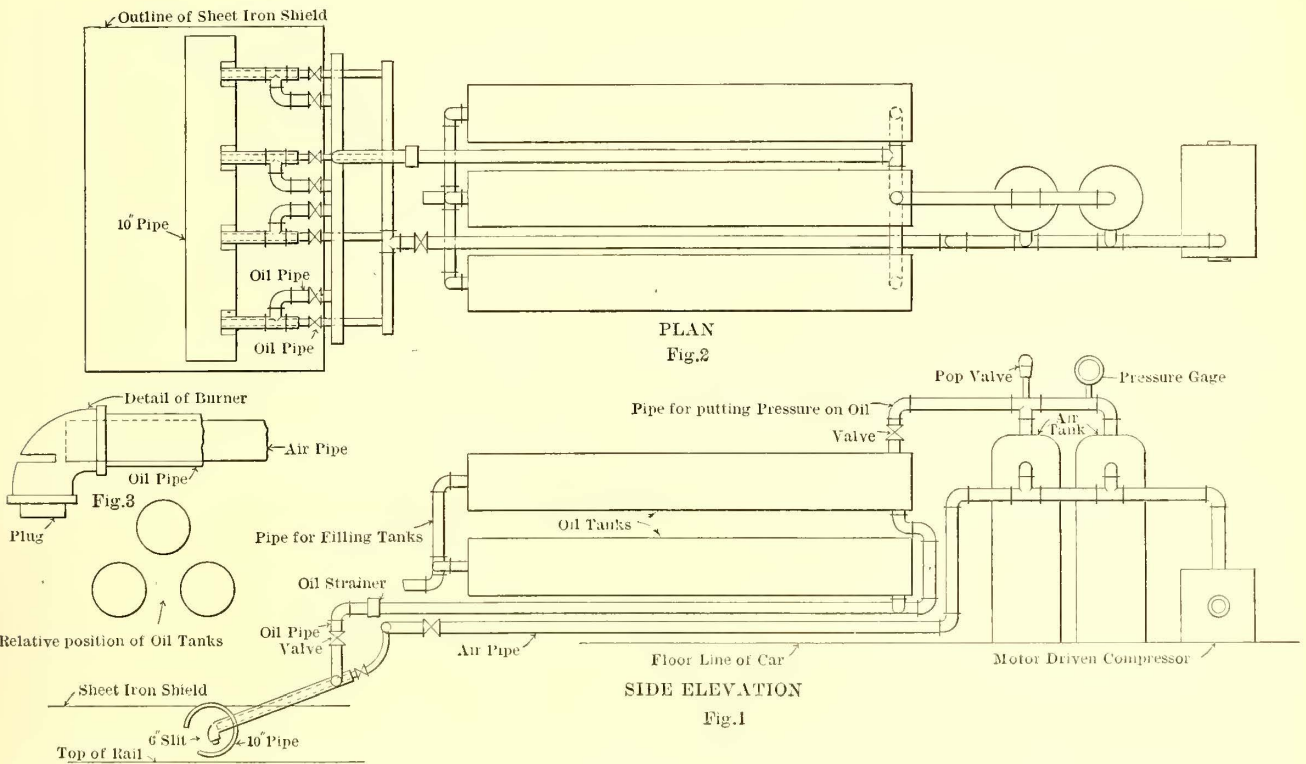
These drawings do not represent the exact arrangement of the device, but show enough of its main features to enable others to construct such a machine.

This device has been effective in clearing the track of



PART END VIEW OF WEED BURNER

weeds and grass and has saved a large amount of labor. The oil reservoirs used are some formerly employed by the company for storing air on their cars, and the compressor was taken from an air brake outfit. Barrels of water or



Street Railway Journal
 SIDE ELEVATION, PLAN AND DETAILS OF WEED BURNER USED BY THE NORTHERN TEXAS TRACTION COMPANY

pressure from the oil while the outfit is not in use. The air compressor has an automatic governor which cuts out the motor when the desired air pressure is attained and cuts it in again when the pressure falls below a certain value. The current for the compressor motor is supplied through a wire from the motor car.

Fig. 1 shows a side elevation of the outfit; Fig. 2 shows

fire extinguishers are carried on the car to put out a fire should the ties ignite or should the fire get from the right of way on to neighboring ground.

The device was designed by G. H. Clifford superintendent; E. L. White, chief engineer, and Theodore Taylor, master mechanic of the interurban division of the Northern Texas Traction Company.

CORRESPONDENCE

RAIL CORRUGATION

PHILADELPHIA, Oct. 30, 1907.

Editors STREET RAILWAY JOURNAL:

In your "Convention Report-I," of recent date, in quoting my remarks on "Rail Corrugations," it appears that they may leave a vague idea, and in some respects may cause an erroneous conclusion. Therefore, I thought it well to write this in order to establish the correct thought that it was desired to convey.

The idea advanced was, that corrugations were caused by the elongation of the upper surface of the metal of the rail under traffic or rolling action of the wheels. That such elongation does take place is an established fact. This can be seen in all old tracks which appear in the streets in vertical and horizontal curves; the length of the curves being the length of the rail in both planes. The horizontal curves have their rise at the middle of the rail, the joints being outward of the track, forming a wide gage at these joints. When an old track is taken up, the loose rails are distinctly and permanently curved. How could these curves be explained otherwise than by the elongation of the upper surface under the rolling action of the tread of the wheel and the friction of the flanges against the gage surface of the rail? The expansion of the exposed portion of the metal, due to the variation in temperature, could have very little, if any, influence upon this—for it works in both directions, and therefore has a compensatory effect.

In order to understand this rolling action that causes the elongation, it can readily be assumed that the weight or pressure of the wheels produces an indentation in the surface of the rails. This indentation is moved along causing the upper layer of the metal to flow in the direction of the traffic. When the movement of the wheels is slow it permits the metal to assume its original position on account of its elasticity. But when this movement is rapid, the stresses produced by this flow of the surface of the metal, results either in curving of the rail (elongation of the surface), when the rail is on a loose foundation; or in case of a solid foundation, which permits of no such distortion, it results in gradually pressing or rolling the surface metal until a maximum compression is reached when the metal is formed into a hump, over which the wheels roll over and begin their action again; thus forming elevations and depressions at regular intervals—corrugations.

In assuming a cause, in explanation of a phenomenon, such an assumption may only then be dignified a theory, when, if not all, at least most of the known facts relative to such a phenomenon may be explained by this theory. And it appears to me that by careful analysis it will be found that by assuming the above theory as the cause for corrugations, all the varying, peculiar and seemingly contradictory manifestations of corrugations can be readily explained by it.

From the quotation it may further appear that there was an advocacy of a dirt foundation for track construction. This is entirely contrary to what it was desired to assert. In order to explain under what conditions corrugations cannot occur it was assumed, and this is quite evident, that cars run on two parallel lines of rails loosely placed on the surface of the earth, and without being held down in any way, will never cause any corrugations.

But in a question of track construction there are so many important and paramount considerations which must govern the decision, that the trouble of corrugations is but secondary. Economy in the permanency of road-bed and paving, to avoid the ruinous expense on the maintenance of track, paving and rolling stock, the life of rail and joints, etc., is of so much vaster importance that the question of possible occurrence of corrugations (while the latter may be a contributing cause), can influence the decision but slightly; aside from the fact that in paved streets loose tracks of such construction as mentioned above, and where corrugations cannot occur, is out of the question, as it cannot be built. Therefore, there can be but one conclusion, that a firm and permanent foundation, with the rail held on it as firmly as it is possible to attain in practice, and an ideal one, upon which rails may be renewed without the disturbance of the foundation, such as concrete, is the only practical and economical construction that can be advocated for paved streets, and especially so on busily traveled streets. Corrugations will or may occur, but after one thorough, or possibly two filings, they will never become a cause of annoyance again; for the upper and gage surface textures will be compressed into such hardness that the wheel will not produce further indentations.

One other point is necessary of correction: for the words "systematic investigation" should be substituted "scientific investigation," which was stated, and is probably a transcription error. Systematic investigations have been made, such as could be accomplished under conditions that already exist. But in order to make a scientific investigation, conditions must be created especially for such an investigation, as it was mentioned in the discussion. Of course, the expense may be such that only a large association such as the American Street & Interurban Railway Association can afford to undertake. C. B. VOYNOW.

**MEETING OF THE ELECTRICAL INSTITUTE ON NOV. 8
TO DISCUSS ELECTRIC LOCOMOTIVES**

The American Institute of Electrical Engineers has set aside Friday evening, Nov. 8, to a paper on the comparative performance of steam and electric locomotives, by Albert H. Armstrong, of the Railway Engineering Department of the General Electric Company. Mr. Armstrong's paper treats of steam and electric locomotives with particular reference to the operating expense as affected by their different characteristics. Among those scheduled to take part in the discussion are Cary T. Hutchinson, consulting engineer, New York; Frank J. Sprague, consulting engineer, New York; W. J. Wilgus, vice-president N. Y. C. & H. R. R. Co., New York; N. W. Storer, electrical engineer, Westinghouse Electric & Manufacturing Company, Pittsburg, Pa.; George R. Henderson, mechanical engineer, New York; L. B. Stillwell, consulting engineer, New York; J. G. Muhlfeld, superintendent of motive power, Baltimore & Ohio Railroad, Baltimore; B. F. Wood, electrical engineer, Pennsylvania Railroad, Altoona, Pa. An extended report of the meeting together with Mr. Armstrong's paper will be published in the next issue of the STREET RAILWAY JOURNAL.

NEXT CENTRAL ELECTRIC MEETING

The next meeting of the Central Electric Railway Association, which was scheduled for Nov. 21, will probably be postponed until Nov. 25 or Nov. 28.

TWO-BAR EQUALIZER TRUCK FOR TRANSIT DEVELOPMENT COMPANY

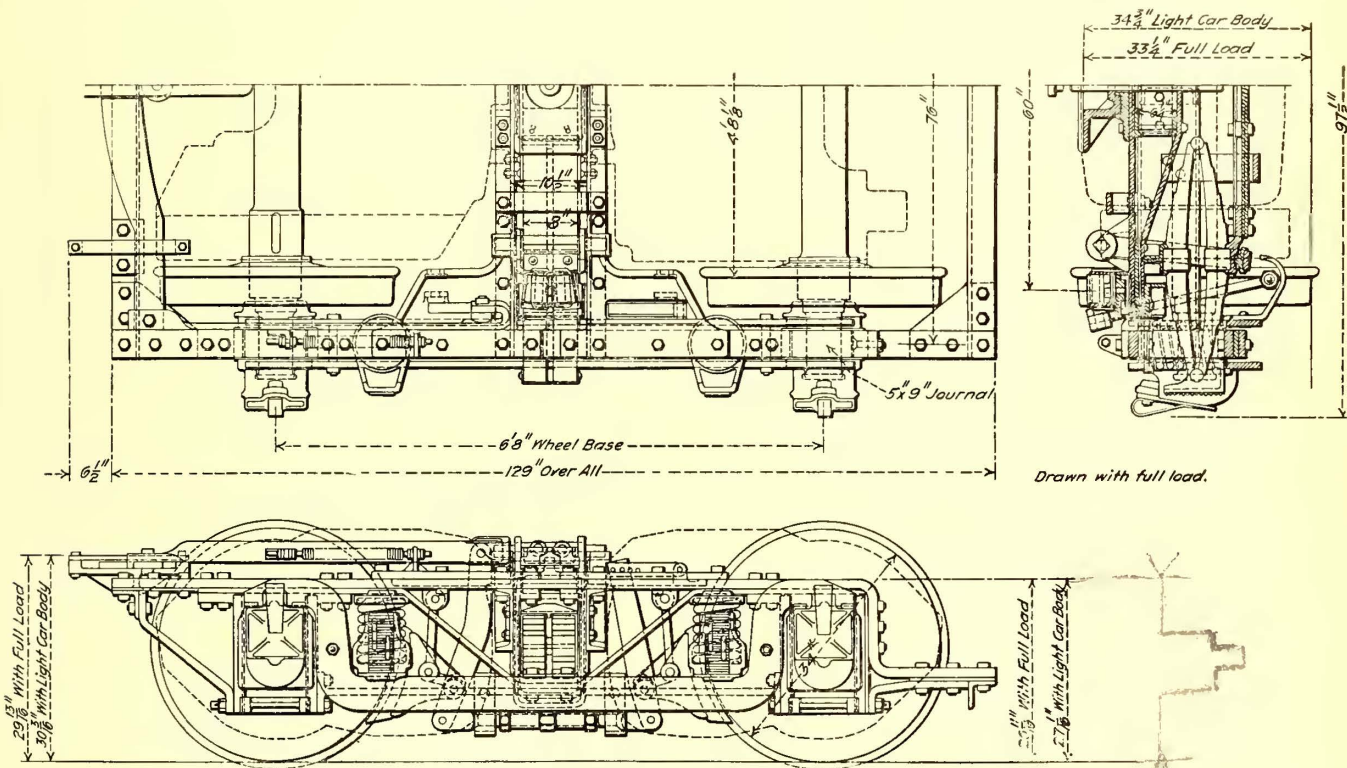
The accompanying drawing shows one of the 101 motor trucks now being built by the American Locomotive Company for the Transit Development Company, which purchases the rolling stock for the Brooklyn Rapid Transit System. These trucks are to be used under the 1907-type of semi-convertible elevated motor cars, and are for delivery during October and November.

The general design was prepared by the builder in consultation with the company's engineers and embodies all of the features of the American Locomotive Company's standard interurban truck. At the same time the details include many of the Brooklyn Rapid Transit patterns. A careful study of the engraving will show the distinguishing features of the design. The more prominent of these are the cast-steel transom gussets which tie the side frames and trans-

Springs (under bolster), double elliptic.
 Springs (on equalizers), double coil.
 Weight without motors, wheels or axles, about 6500 lbs.
 Weight complete with motors, about 12,000 lbs.

THE STRENGTH OF STRUCTURAL TIMBER

Recent tests by the Forest Service of loblolly, longleaf and Norway pines, tamarack, Douglas fir and western hemlock show longleaf pine to be the strongest and stiffest of the timbers, with Douglas fir a close second; while western hemlock, loblolly pine, tamarack, and Norway pine follow in the order given. Fortunately, Douglas fir and western hemlock, of which there are comparatively large supplies, have high structural merit, as has also loblolly pine, the chief tree upon which the southern lumber companies are depending for future crops. Much of the information hitherto available concerning the strength of timber has



TWO-BAR EQUALIZER TRUCK FOR BROOKLYN

soms and embrace in the one casting swing-link bearings, brake hanger brackets or lugs and brake release-spring brackets. This feature of the design eliminates a number of small castings, bolts and rivets, which are generally used when each of the foregoing parts are separate details. The general dimensions, clearances, etc., are made to conform to the requirements of the cars. It will be noted that this necessitated the dropping of one end of the top frames to clear the car body platforms.

The general dimensions and specifications are as follows:

- Type, 2-bar equalizer and swinging bolster.
- Gage of track, 4 ft. 8 1/2 ins.
- Wheel base, 6 ft. 8 ins.
- Total length, 10 ft. 9 ins.
- Transverse centers of frames, 6 ft. 4 ins.
- Height top of rail to top of car body center plate, 34 3/4 ins.
- Load at center plate, 28,500 lbs.
- Wheels, 34 in. dia.
- Axles, 6 1/2 ins. dia.
- Journals, 5 ins. x 9 ins.
- Boxes, Synnington.

been secured from tests of small pieces without defects. This cannot safely be assumed to hold good for large-sized timbers as found on the market, since these commonly contain such defects as checks, knots, cross grain, etc. The location of the defects varies the extent to which they lessen its strength; and the proportion of heart and sap wood, and the state of seasoning, must also be considered. Circular 115 of the Forest Service, just issued, which gives the results of tests conducted during the past four years, will be mailed upon application to The Forester, Forest Service, Washington, D. C.

Both city and interurban cars of the Mahoning & Shenango Railway are being equipped with Schoen steel tire wheels. New wheels are 34 ins. in diameter and they will be worn down to 29 ins., when it is expected to turn them and equip them with steel tires. For high-speed service 7/8-in. flanges are employed. On low-speed work a 5/8-in. flange is used. The flanges are turned in the shop to suit the service.

BALTIMORE COMPANY MAKES RECORD HANDLING "OLD HOME" TRAFFIC

An "Old Home" celebration was held in Baltimore beginning Oct. 13, and extending to Saturday, Oct. 19. Like similar events of its kind, it resulted in a large attendance at the special entertainment features of people from even remote parts of the country.

Various estimates have been made of the number of people participating, but they are all speculative, with the exception of the returns of traffic of the United Railways & Electric Company, which reports having carried more than 3,000,000 passengers, a figure which does furnish a basis for estimating the number of visitors. Naturally the entertainments arranged imposed extra obligations upon the company, and made it necessary, temporarily, to modify the operation of cars to suit the requirements of the occasion. In many cases service was entirely abandoned on certain routes for short periods, while on others cars were operated over only a part of the line. In addition special plans had to be made for meeting the exigencies of the situation in the evening, when celebrations were held, continuing till a late hour, and throwing the burden of transporting all the celebrants within a very short period. Briefly, the events may be summarized as follows: Sunday, German Singing Society Concert at Druid Hill Park; Monday, baseball parade; Tuesday, military parade and bombardment of Fort McHenry; Wednesday, fraternal orders parade; Thursday, municipal parade, municipal pageant, regatta; Friday, carnival parade.

The instructions to the employes included all assignments at points along the different lines, and full details as to the operation of the lines, including the routes, the increasing of service and all arrangements affecting the operation of cars. The complete schedule of events for the week was also made readily available for consultation. Despite the obligations imposed upon the company a record was made for handling traffic that evoked favorable editorial comment from all the newspapers, and resulted in a letter of commendation from Mayor Mahool to President House of the company, as follows:

"My Dear Mr. House: It is doubtful if anybody in Baltimore has been more severely tried than has the United Railways & Electric Company during the past week. Your corporation and our admirable police force have been the main sufferers during this week of enjoyment. With such immense throngs frequenting the streets as has marked the past seven days, it is a matter of great wonder to me how your corporation succeeded in handling the people half so well as it did. Really, I hardly see how anybody but a chronic grumbler could complain at the car service.

"I know about as well as anybody in Baltimore how difficult was your problem. That is why I watched the service so closely myself and also made special inquiry all along the line. Be it said of your corporation that almost everybody is commending the United Railways Company for its general efficiency. Of course, nobody expected car service in the midst of crowds like that to be as regular and as comfortable as it is under normal conditions, and yet, as a matter of fact, I found that it was comparatively easy to secure transportation and to secure it under satisfactory comforts when all the surrounding conditions are properly taken into consideration.

"I want to publicly thank you for the extraordinary labor on the part of yourself and all members of your corporation, in thus serving the comfort of our people. I feel very appreciative

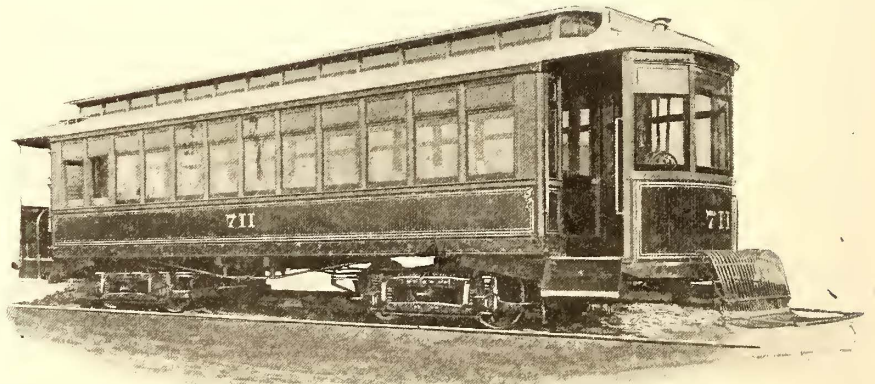
myself and I feel satisfied that every Baltimorean and that every visitor approves these views. Very truly yours,
J. BARRY MAHOOL, Mayor.

OVERCOMING MOTOR LEAD TROUBLES ON DOUBLE TRUCK CARS

Troubles with motor leads on double-truck cars are being obviated on the Mahoning & Shenango Railway by bringing all four leads up over the top of the motor and cleating them over the shell with a four-wirewood cleat held by bolts screwing into the shell. The leads are then brought up with an S bend to the car body at the bolster, and are secured to the car body by two four-wire wood cleats, placed one on each side of the connectors. These cleats also serve to hold in place the short sections of circular loom with which the connectors are covered. No tape is employed. An additional four-wire cleat, which might be termed a floating cleat, is bolted over the wires as they make the S bend. This cleat and the wires as well are held away from the bolster by a small wire attached to the motor-shell.

THIRTY-FIVE NEW CARS FOR OMAHA

The Omaha & Council Bluffs Street Railway Company has considerably added to its rolling stock of late to the extent of 35 closed cars built by the American Car Company. Thirty of these cars—28 ft. in length—have longitudinal seats, as they are for local service, and as much standing room as possible is allowed for. The 34-ft. cars, which will run between Omaha, Benson, Florence, Dundee and Council Bluffs, have the transverse seats in the center with longitudinal seats at the rear occupying the space of two windows. The distinctive, if not unusual, feature of both lots of cars is the method employed of handling the passengers. The cars run in one direction only and the door at the front end is placed to one side so that passengers on entering and leaving will not interfere with the motor-man, who has a compartment to himself which extends from the car body to the corner vestibule post. The platforms at the rear are of the familiar "Detroit" type, which solves the



ONE OF THE LATEST OMAHA CARS, READY FOR SERVICE

problem of how best to handle a number of passengers at the same time. Since only the large car is shown in the engraving, the dimensions of that type are given. They are as follows: Length over end panels, 34 ft.; over crown pieces, 45 ft.; width over sills including sheathing, 8 ft. 3 in.; height from floor to ceiling, 8 ft. 4¼ ins.; from track to under side of sills, 9 ft. 7¾ ins.; size of side sills, 2¾ ins. x 7¾ ins.; end sills, 4½ ins. x 7¾ ins.; sill plates, 8 ins. x 5/8 in. These cars are mounted on No. 27-El trucks with 6-ft. wheel base.

LEGAL DEPARTMENT *

INTOXICATED PASSENGERS

A railroad company is not obliged to accept as a passenger a person who is so intoxicated as not to be able to take care of himself or as to be dangerous to fellow passengers. If an intoxicated person does, however, gain entrance to a car, the duty arises of protecting other passengers from injury through his acts. Thus, in a recent case in the Supreme Court of Alabama (*Montgomery Traction Co. vs. Whatley*, 44 So., 538) it was held that where a street car passenger was so intoxicated as to be unable to stand, and his condition was known to the conductor, the latter was negligent so as to charge his employer with liability in permitting the drunken man to walk up and down the aisle when the car was in motion, with the result of falling upon and injuring a fellow passenger. Such liability has been carried quite far, as, for instance, in the recent decision of the Court of Appeals of Georgia in *Grimsley vs. Atlantic Coast Line R.R.* (57 S. E., 943), wherein it was held that whether, in the exercise of the extraordinary care required, the servants of a carrier should have apprehended that an intoxicated passenger, who was armed with a pistol and who had been shooting it while on the train, would jump from the train at a station and fire the pistol into the coach, injuring another passenger, is a question to be decided by the jury, and not by the court on demurrer.

Although, as above stated, access may be refused, a certain duty is imposed upon the carrier to protect the intoxicated person himself, if once aboard a car or other vehicle, from danger arising through his condition; and this, notwithstanding voluntary intoxication is not a defense for criminal acts, and an intoxicated condition may always be taken into consideration as one of the circumstances to show contributory negligence. Thus, in *Doherty vs. California Navigation, etc., Co.* (91 Pac., 419) in the Court of Appeal of California, it was held that where the captain of a steamship discovered a passenger lying in a drunken and helpless condition on the floor, and, with knowledge of his helplessness, lifted him to his feet and left him without any support, whereupon he fell and broke his arm, the captain did not exercise the full degree of care required by rendering assistance sufficient in the case of a sober man, but was bound to exercise such care as he could to avoid an accident in the situation presented to him. The court said in part:

"For an injury resulting from prior or concurrent negligence contributed he could not recover, but if the defendants with knowledge of the plaintiff's danger in the performance of the duty owed by them could have prevented the injury, they were bound to do so, and their breach of duty would be the legal cause of the injury, unless at the time of the injury the plaintiff by the exercise of due care could have avoided it. If the plaintiff could not have prevented the injury to himself and the defendants could by the care the situation required of them, they are liable if they did not, although the plaintiff's inability resulted from his prior negligence or intoxication."

ORDINANCES, CHARTERS, FRANCHISES, ETC.

ALABAMA.—Nuisance—Public Nuisance—Injunction—Special Damage.

Where a railroad constructed and operated its track on the alley of a city, without authority of law, and built a fence and gate across it, thus inclosing one end of the alley and cutting off entirely the communication of owners of lots abutting on the alley through the alley with another street, it constitutes a general nuisance, which the lot owners were entitled to enjoin, their damage being distinct from that of the public generally.—(*Birmingham Ry., Light & Power Co. vs. Moran et al.*, 44 S. Rep., 152.)

*Conducted by Wilbur Larremore, of the New York Bar, 32 Nassau Street, New York, to whom all correspondence concerning this department should be addressed.

ILLINOIS.—Street Railroads—What Constitute—Use of Streets—Connection with Commercial Railroad.

Where an electric railway company was chartered under the general railway act, and, by its charter, was authorized to operate between two cities and transport passengers, mail, express and other matter, it was a commercial railroad, and not a street railroad.

A city ordinance authorized the construction and operation of a street railway in the streets of the city, and a subsequent ordinance also authorized the operation of a street car line or street railway therein. *Hurd's Rev. St.* 1905, c. 114, § 44 provides that railroad companies shall have power to make such contracts with each other for leasing or running their roads or any part thereof as shall be necessary to effect the object of the act. Section 45 provides that railroad companies shall have the right of connecting with each other. A railroad chartered under the general railway act, and engaged in operating an interurban electric railway for the conveyance of passengers, mail, express and other matter, not having the right to come within the city limits, contracted with plaintiff company, which was the assignee of both grants of authority from the city operating therein a street railway, whereby plaintiff company agreed to carry all passengers, and so far as it was able to do so, under municipal and statutory regulations, express, mail, or other matter from the connecting point at the city limits to points along its line within the city, and vice versa. Under the agreement, the interurban cars were leased to plaintiff company and were to run upon its tracks and the interurban employees were to be deemed the employees of plaintiff company while in the city limits. Held, that plaintiff company did not by virtue of the ordinances and sections 44 and 45 obtain the right to authorize the interurban company to use plaintiff's tracks over which to operate its cars without permission from the city, and that being the effect of the contract, it was entered into without right and did not confer any authority on the interurban company to bring its cars within the city limits.—(*City of Aurora et al. vs. Elgin, A. & S. Traction Co. et al.*, 81 N. E. Rep., 544.)

INDIANA.—Eminent Domain—Street Railroads—Interurban Railroads—Compensation to Property Owners—Injuries to Abutting Property—Rights of Property Owners.

The operation by a corporation, organized under the statute providing for the incorporation of street railway companies, of interurban cars on streets of a city with its permission, for the carriage of passengers, express and light freight, is not an additional servitude on the streets, and abutting owners are not entitled to compensation therefor.

An owner of property abutting on a street on which interurban cars are operated may prosecute an action for special damages resulting from the improper operation of the cars, notwithstanding a sale of the property pending the action, and notwithstanding an injunction to restrain the wrong complained of is sought, and may recover the damages sustained up to the time of the bringing of the action.

A street railway company operating on a city street, for the carriage of freight and passengers, interurban trains of three cars, each 60 feet in length, at a rate of 20 to 30 miles an hour, thereby rendering the use of the street dangerous, and thereby causing the house of an abutting owner 60 feet from the track to shake so as to cause the plastering and ceilings and the pictures on the walls to fall, and to disturb the comfort of the owner and his family occupying the house, is liable to the abutting owner for the special damages sustained; the operation of its cars in such a manner by a street railway being unlawful and unjustifiable.—(*Kinsey vs. Union Traction Co. et al.*, 81 N. E. Rep., 922.)

INDIANA.—Eminent Domain—Persons Entitled to Take—Necessity of Legislative Authority—Lessees of Railroads—Street Railways—Street Railroads—Transmission Lines—Public Use—Construction of Legislative Act—Proceedings—Sufficiency of Description in Complaint—Statutes—Subjects and Title—Acts Relating to One or More Subjects—Nuisances—Transmission of Electricity.

A lessee of a railroad cannot condemn lands for a use appurtenant to a way of the lessor, unless expressly so authorized by statute.

Acts 1903, pp. 92, 94, c. 36, conferring the power of eminent domain, provides that any street railroad company having constructed or acquired any street railroad or interurban street

railroad shall, in addition to the rights already given by law to street railroad companies, possess the power to receive, acquire and take, by special proceedings hereinafter provided, lands and other property necessary for the construction of lines for transmission of electricity. Held, that it conferred the power upon lessees of street and interurban railroads.

Under the express provisions of Acts 1903, pp. 92, 94, c. 36, a street or interurban railroad company has the power to condemn land for a transmission line which may be on its line of road, or elsewhere, as the company may desire.

Where the Legislature has authorized the taking of lands for the use declared in a complaint in condemnation proceedings, the court will not decline to acknowledge it a public use, merely because of an incidental private advantage, unless it is manifest that the proposed use does not imply a right in the general public to its enjoyment.

Acts 1905, p. 60, c. 48, provides that, where a right of way is sought, the complaint in condemnation proceedings must state the location, general route, width and termini thereof, and a specific description of each piece of land to be taken. A complainant averred that the defendant owned a quarter section particularly described, and that plaintiff desired to construct its transmission line on and over said tract by replacing 24 poles 115 feet apart across the land from the west side to the east side thereof, which poles were to be placed within 6½ feet of the fence on the north side of the right of way of a certain railroad through the land on a strip of land 6½ feet wide running in a diagonal manner through the quarter section on the north side of and parallel with and immediately adjoining the railroad right of way, as then located through the land; the amount of land actually occupied by the poles being not to exceed 40 square feet. Held, that the description was sufficient.

Const. art. 4, § 19, provides that "every act shall embrace but one subject and matters properly connected therewith, which subject shall be expressed in the title." The title of an act was "An act to amend sections one (1), four (4) and five (5) of an act, entitled 'An act concerning street railroad companies, granting additional rights and powers therein specified and matters relating thereto, and declaring an emergency.' . . ." It embraced the general subject of street railroad companies, and gave power to acquire ground for the construction of lines for the transmission of electricity for light, heat and power. Held not to violate the constitutional provision.

The transmission of electricity at a high voltage over a right of way, being authorized by law, is not a nuisance per se.—(Mull vs. Indianapolis & C. Traction Co., 81 N. E. Rep., 657.)

MINNESOTA.—Street Railroads—Corporate Powers—Extent—Who May Question—Advertising in Cars.

The publisher of a weekly newspaper, containing, among other things, advertisements, sought to enjoin a street railway company from placing advertisements on the upper inside parts of its cars, because, as a result, that company diverted a large and lucrative business, which otherwise he might have been able to secure. It is held that this was not sufficient to entitle plaintiff to litigate the question whether the acts of the defendant were ultra vires or not.—(Burns vs. St. Paul City Ry. Co., 112 N. W. Rep., 412.)

NEW YORK.—Carriers—Street Railroads—Transfers—Construction.

Railroad Law, Laws 1890, p. 1114, c. 565, § 104, as amended by Laws 1892, p. 1382, c. 676, requiring every street railway company contracting with another company for the use of their respective roads to carry passengers for one fare between points on the railroads embraced in the contract where the passenger desires to make one continuous trip, relates to companies that have entered into contracts with other companies to insure a continuous passage from a point on one road to a point on the other road embraced in the contract, and does not apply to a company running short service and long service cars over its own line.

A street railroad must transport for a single fare a passenger whose fare is accepted on any car to any point on its line reached by cars running in that direction, regardless of whether or not the car boarded is a short service or a long service car.—(Baron vs. New York City Ry. Co., 105 N. Y. Sup., 258.)

NEW YORK.—Eminent Domain—Street Railroads—Change to Elevated Road—Statutes—Title—Subject—Construction.

If a street railroad has as against an abutting landowner a prescriptive right only, it cannot change from the surface to

an elevated structure without compensating him for the added interference with his easement of light, air and access.

The title of Laws 1855, p. 854, c. 475, reciting in detail its purpose to be the widening and extension of an avenue and the ratification of an agreement between a railroad company, a city, and another providing for the cession of railroad lands to the city in exchange for an exclusive right to occupy a strip in such avenue, was not violative of Const. 1846, art 3, § 16, as embracing more than one subject, the agreement being an essential part of the scheme of improvement.

Statutes authorizing the taking of land may not be extended by implication, and no greater right is acquired than is necessary to satisfy the purpose of the statute.

Though an abutting landowner was not bound by a tripartite agreement between a city, a street railroad company and its lessor, whereby railroad lands were ceded to the city, and the company acquired an exclusive right to use a strip of land in an avenue to be improved, the owner was bound by proceedings taken pursuant to an act, providing that the improvement should be made, and the proceedings of the commissioners under the act should be subject and in conformity to the terms of the agreement.

Where a perpetual right to the exclusive use of a strip in an avenue for railroad purposes was acquired by condemnation proceedings many years ago, it must be assumed that the damages awarded an abutting landowner included the value of the premises actually taken and the damages resulting to the residue, including those to be sustained by reason of the use to which the portion taken was to be put, and such damages could not be lessened by the fact that there might be a possibility of a reverter, and hence, when the company was compelled by the Legislature to elevate its tracks, it took no property of such abutting landowner's remote grantee, since the former award must be presumed to have included the damage resulting from the change.—(Leffmann vs. Long Island R. Co., 105 N. Y. Sup., 487.)

NEW YORK.—Licenses—Rights in Real Estate—Revocation.

An instrument under seal, executed by one owning the fee to the center of a street and premises abutting thereon, which recites that an elevated railway company is operating its road in front of the premises, and which declares that the owner consents thereto and that he discharges the company from all demands for compensation arising therefrom, is a license only, and is revoked by his conveyance of the premises to another, who may enjoy the company from maintaining and operating the road in front of the premises.—(Smyth vs. Brooklyn Union Elevated R. Co. et al., 105 N. Y. Sup., 602.)

PENNSYLVANIA.—Street Railroads—Right to Use Street—Condition of Grant—Forfeiture of Franchise.

A city gave by ordinance a street railway company the right to use a particular street, reserving the right to grant to any other railway company rights in the same street. The mayor required the railway company, in consideration of the ordinance, to agree to arbitrate any dispute with another company to which the right to the street might be granted. Held, the company could not allege that the agreement for arbitration, not being a part of the ordinance, was not binding on it.

Where an ordinance giving a street railway company the right to use a street contained no clause of forfeiture, an agreement of the company with the mayor, at the time of signing the ordinance, to arbitrate any difficulty with another street railway company seeking to use the street, did not give the city the right to the street might be granted. Held, the company unable to agree with the second arbitrator in the choice of a third.

Where a city gave a railway company by ordinance permission to use a street in question, with a provision therein reserving the right to another company to use the same street, the city cannot maintain a bill in equity to compel the first company to permit the second company to use the street, the party aggrieved in such case being the second company.—(Chester City vs. Union Ry. Co. of Chester et al., 66 Atl. Rep., 1107.)

TEXAS.—Street Railroads—Equipment—Regulations—Statutes—Validity.

Act April 3, 1903, providing that each street car shall be equipped during the winter months with a vestibule to protect the motorman, is within the police power of the State, and is valid.—(Beaumont Traction Co. vs. State, 103 S. W. Rep., 238.)

WISCONSIN.—Eminent Domain—Statutory Provisions—Interurban Railroads—Railroads—Interurban Roads—Articles

of Incorporation—Statement of Business—Designation of Termini of Road—Conflicting Locations—Rights by Prior Location.

Rev. St. 1878, § 1820, authorized the formation of corporations for general commercial railroad purposes, and section 1862 the formation of street railway corporations, with the right to accept franchises from municipal corporations to operate their cars on city streets. Section 1863 authorized street railway corporations to extend their railways to adjoining towns, and for such purpose to use the highways of the town upon consent of the proper authorities. Laws 1880, p. 255, c. 221, in amendment of section 1863, added an additional clause authorizing the formation of corporations for the purpose of constructing and operating street railways in any village or town or to extend from any village or town to, into, or through any other, and running cars propelled by animals for the carriage of either passengers or freight. Laws 1891, p. 915, c. 387, struck out the word "street" before "railways," and inserted "or other power" after the word "animals," and, as amended, section 1863 was inserted in Rev. St. 1898, where it appears as section 1863. Laws 1897, p. 290, c. 175 (St. 1898, § 1863a), confers the power of eminent domain on any street or electric railroad corporation. Held, that Rev. St. 1878, § 1863, amended by Laws 1880, p. 255, c. 221, and by Laws 1891, p. 515, c. 387, now all embodied in St. 1898, § 1863, and St. 1898, § 1862, being the same as Rev. St. 1878, § 1862, authorized the formation of two distinct classes of railroad corporations other than the commercial steam railroad, one being the municipal street railroad and the other the electric interurban, and such electric interurban railroads, as well as street railroads, being empowered under St. 1898, § 1863a, to exercise the right of eminent domain.

St. 1898, § 1863, authorizes the formation of corporations for the purpose of building and operating railways in any village or town, or to extend from any village or town to, into, or through any other village or town. Section 1772 requires the articles of incorporation of any corporation to state its business or purpose. Held that, to incorporate as an interurban railway corporation under section 1863, it was not a prerequisite that the articles of incorporation designate the termini of the road, but articles of incorporation, stating that the purpose of the corporation was to construct and operate street railways in a city named and elsewhere in the state, and to extend its lines into or through any village or town, sufficiently stated its business or purpose to entitle it to incorporate as an interurban railway under that section.

Petitioner, an interurban railroad corporation, began its survey over a certain route in 1903, but did not complete the same until May, 1905, and the line was not adopted by its board of directors until January, 1906. The parties who later organized defendant interurban corporation completed their survey over the same line in November, 1905, and staked the same out. Defendant was incorporated in October, 1905, and the work already begun progressed without interruption. Money was paid in by the stockholders, and resolutions were adopted by the directors authorizing the officers to contract with one of the parties who had organized defendant for the acquirement of all necessary additional right of way and franchises, and appropriating money to pay for right of way already secured, and on account of additional right of way to be secured, etc. Acting upon such resolutions, assignments of the option contracts already procured were secured to defendant, and further contracts were obtained, so that, before the time of the resolution adopting the route by petitioner, defendant owned option contracts covering eight out of nine miles of the disputed right of way, together with the necessary franchises. Held, that the acts of defendant constituted a complete location of the route prior to the time of the adoption of the route by petitioner by resolution in January, 1906, and hence, that being the decisive corporate act by which location of the route was made by petitioner, defendant's right to the route was prior to petitioner's.

That defendant corporation adopted surveys already made by other parties did not affect its rights.

It was not essential to the location of the route by defendant corporation that it secure deeds of the right of way or binding contracts for its purchase.—(In re Milwaukee Light, Heat & Traction Co. Milwaukee Light, Heat & Traction Co. vs. Milwaukee Northern Ry. Co., 112 N. W. Rep., 663.)

LIABILITY FOR NEGLIGENCE.

DELAWARE.—Street Railroads—Persons on Street—Injuries—Negligence—Burden of Proof—Use of Streets—Contributory Negligence—Proximate Cause—Voluntary Intoxi-

cation—Damages—Personal Injuries—Measure of Damages.

1. In an action for injuries to plaintiff, while lawfully using a street, by a collision with one of defendant's street cars, the burden was on plaintiff to prove that his injuries resulted from defendant's negligence, as alleged, which negligence could not be presumed.

2. Where plaintiff was injured in a collision with a street car as he was assisting in loading a van with furniture in the street in front of his residence, the rights of plaintiff and the owners of the street car to use the street were reciprocal; each being bound to use due care not to infringe the rights of the other.

3. Where a street car approached a point where plaintiff was loading a van with furniture in the street, it was the duty of the motorman to sound the gong, ring the bell, slow up, or stop the car in the presence of danger to plaintiff, according to what was reasonably demanded by all surrounding circumstances to prevent injuring him.

4. Where plaintiff, in an action for injuries received in collision with a street car, was negligent, and such negligence contributed to the injury, plaintiff could not recover, though the railroad company was also negligent; but if, notwithstanding plaintiff's negligence, the railroad company could have prevented the accident by the use of ordinary care, plaintiff's negligence was no defense.

5. If plaintiff suddenly moved from a position of safety to a position of danger on or near defendant's street car track, so that it was impossible for the motorman to stop the approaching car before collision, defendant was not liable for plaintiff's resulting injury.

6. In an action for injuries to plaintiff by being struck by a street car, plaintiff's voluntary intoxication, if it caused him to omit to take reasonable care for his safety, might be considered in determining whether plaintiff was negligent.

7. In an action for injuries to plaintiff in collision with a street car, the measure of plaintiff's damage was such sum as would compensate him for his injuries, including loss of time and wages, and pain and suffering, past and future, resulting from the accident, and also for any future impairment of ability to earn a living.—(Heinel vs. People's Ry. Co., 67 Atl. Rep., 173.)

DELAWARE.—Carriers—Passengers—Duty of Carrier—Defective Appliances—Injury to Passengers—Proximate Cause—Damages—Personal Injuries—Measure.

1. A common carrier of passengers is bound to provide safe cars, keep them in good repair, and do all things reasonably necessary to secure safe transportation of passengers from place to place and their safe departure from the cars after reaching their destination.

2. A street railway company, as a common carrier of passengers, while not an insurer of a passenger's safety, is required to exercise the highest degree of care and diligence reasonably practicable.

3. Where plaintiff, a passenger on a street car, claimed that she was injured while attempting to alight because of the defective condition of a step of the car, she was bound to show that she was injured while in the exercise of due care, and that the defective step was the proximate cause of her injury.

4. A street car passenger was entitled to assume that the platform, steps, or running boards of a street care were reasonably safe for her to use in alighting from the cars, unless she knew, or by the exercise of ordinary care could have known, that they were defective.

5. In an action for injuries to a passenger, the measure of damages was such a sum as would reasonably compensate her for injuries she sustained, including pain and suffering, and all disabilities that had resulted therefrom.—(Smithers vs. Wilmington City Ry. Co., 67 Atl. Rep., 167.)

DELAWARE.—Negligence—Question for Court and Jury—Street Railroads—Injuries to Traveler—Contributory Negligence—Evidence—Custom—Pleading.

1. In an action for injuries, it is for the court to say whether there is any evidence from which negligence or contributory negligence can be reasonably and legitimately inferred; but it is for the jury to say whether, from the evidence adduced, when submitted to them, any negligence, and whose, ought to be inferred.

2. In an action for injuries to the driver of a coach in a funeral procession, caused by a collision with a street railway car, evidence held to require submission of the question of

defendant's negligence and of plaintiff's contributory negligence to the jury.

3. In an action for injuries to the driver of a coach in a funeral procession, caused by a collision with a street car, evidence that for a long time prior thereto it had been the custom of the operators of street cars as a matter of privilege to permit funeral processions to pass without a break in the line, and that plaintiff, with knowledge of such custom, relied thereon at the time he crossed the track in front of the car, was admissible, though not pleaded.

4. In an action for injuries to the driver of a coach in a funeral procession by a collision with a street car, evidence as to the condition of travel on the street for two hours, including the time of the accident, was admissible, though not pleaded.—(Wilmington City Ry. Co. vs. White, 66 Atl. Rep., 1009.)

DELAWARE.—Carriers—Street Railroads—Protection of Passengers—Care Required—Obligation of Passengers—Negligence—Reasonable Care—Passengers—Injuries—Actions—Declaration—Proof—Presumptions—Burden of Proof—Damages—Personal Injuries—Measure of Damages.

1. A street railway company, in letting its passengers on and off its cars, must stop its cars at the usual stopping places and wait a reasonable time for passengers to get on or off.

2. A carrier, though held to strict care in the safe transportation of passengers, is not an insurer of their safety, and is only responsible for its own negligence in causing injury to a passenger.

3. Passengers must act with prudence and use the means provided for transportation with reasonable care, and if a passenger's negligent act contributes to an injury he cannot recover.

4. It is the duty of a street car passenger, before alighting from a car, to see that it has stopped and that he may alight safely, and to exercise reasonable care in alighting.

5. Reasonable care is such care as a person of ordinary prudence would take under similar circumstances to avoid accidents, in view of the risks incurred.

6. A passenger, suing a carrier for injuries, must show by preponderance of the evidence that the negligence causing the accident was the negligence described in the declaration.

7. The negligence of a carrier is not presumed from proof of an accident resulting in an injury to a passenger.

8. A passenger, suing a carrier for injuries received through the negligence of the carrier, has the burden of proving negligence.

9. The verdict in favor of plaintiff in a personal injury action should be for such an amount as will reasonably compensate him for the injury sustained, including therein pain and suffering and all disability that may result therefrom.—(Reiss vs. Wilmington City Ry. Co., 67 Atl. Rep., 153.)

ILLINOIS.—Trial—Instructions—Applicability to Pleadings—Damages—Evidence—Remoteness—Appeal—Evidence—Prejudice—Trial—Reception of Testimony—Motion to Strike—Witnesses—Cross-Examination—Scope—Discretion—Appeal—Evidence—Prejudice—Experts—Cross-Examination—Damages—Evidence—Results of Injury—Relevancy.

1. Where, in an action for injuries to a street car passenger, the first count of the declaration charged that defendant caused its cars to be "suddenly and violently started," but the second count alleged that defendant "carelessly and negligently caused the car to be started and moved," a request to charge that the burden was not on defendant to show how plaintiff came to fall, and, if the preponderance of the testimony did not show that she fell by reason of the car being "suddenly and violently started," she could not recover, was properly refused, as eliminating the cause of action alleged in the second count.

2. In an action for injuries to a female street car passenger on July 4, 1902, evidence that she was delivered of a still-born child in January, 1903, and had a miscarriage in June, 1905, claimed to have resulted from the accident, was admissible as bearing on the nature and extent of the injuries; the court having instructed that plaintiff could not recover anything because of the loss of the child or by reason of her miscarriage, but only for personal injuries which she suffered as the result of the negligence charged.

3. In an action for injuries to a female passenger, one of plaintiff's physicians testified that in his judgment the accident caused plaintiff to give birth to a still-born child and also caused a subsequent miscarriage, which answer was stricken at de-

fendant's instance as invading the province of the jury. Held, that there was no reversible error in the subsequent admission of evidence of several physicians that the accident pleaded "could or might" have caused the still-birth of the child and the miscarriage.

4. In an action for injuries, a physician testified that his examination of plaintiff showed that the entire right side up to the wrist was less sensitive to the touch than the left side; whereas, the sensation in the palm of the right hand was greater than in the left. At the close of his evidence, the witness stated that it was difficult to testify as to such matters without telling anything the patient said, because the physician depended so much on the patient's statement, whereupon, on motion, the testimony was stricken. Held, that the court did not err in permitting the jury to hear the testimony until it developed that it was incompetent, because based on plaintiff's statement.

5. Where, in an action for injuries to a street car passenger, one of defendant's investigators testified in its behalf, the scope of cross-examination with reference to the work he had done for defendant in other cases was largely within the trial court's discretion.

6. Defendant was not prejudiced by the exclusion of a question, where all the material parts thereof were subsequently asked and answered.

7. An expert may be cross-examined as to the basis of his opinion, and as to whether the authorities do not lay down a different doctrine.

8. Where, in an action for injuries to a female passenger, it was claimed that the accident caused her to be subsequently delivered of a still-born child, evidence as to the child's weight and whether it was well developed at birth was material, as bearing on the question whether the accident caused it to be still born.—(Chicago Union Traction Company vs. Ertrachter, 81 N. E. Rep., 816.)

INDIANA.—Street Railroads—Collision with Pedestrian—Actions—Complaint—Operation—Injuries to Pedestrian—Contributory Negligence—Proximate Cause.

1. A complaint, in an action against a street railway company for injuries to a pedestrian struck by a car at a crossing, which alleges that the company ran its car after dark without a headlight, that no signal was given as the car approached the crossing, that the car ran at a dangerous speed, and that it negligently ran the car against the pedestrian, injuring him, when liberally construed, as required by Burns' Ann. St. 1901, Section 379, sufficiently charges negligence as against a demurrer or a motion to make more definite and certain.

2. Since under Burns' Ann. St. 1901, Section 359, requiring all defenses except the general denial to be specially pleaded, the burden of establishing contributory negligence is on defendant, a general verdict in favor of plaintiff, in an action against a street railway company for injuries to a pedestrian struck by a car at a crossing, is a finding of freedom from contributory negligence.

3. Where, in an action against a street railway company for injuries to a pedestrian struck by a car at a crossing, it appeared that a wagon passing in front of the pedestrian immediately before the car struck him prevented him from hearing the noise made by the running of the car, and that no signal of the approach of the car was given, the conduct of the pedestrian in walking on the track, if negligent, was not the proximate cause of the injury.

4. Where a motorman in charge of a car could have seen a pedestrian on the street crossing in time, by the exercise of ordinary care, to have prevented an injury to him, it was his duty to do so, regardless of whether the pedestrian negligently came on the crossing.—(Grass vs. Ft. Wayne & W. V. Traction Co., 81 N. E. Rep., 514.)

INDIANA.—Master and Servant—Injury to Servant—Action—Pleading—Fellow Servant's Negligence—Master's Liability—Evidence—Res Gestæ—Admissibility.

1. Where, in an action for injury to a servant, several acts of negligence are sufficiently alleged, recovery will be justified on proof of injury resulting from one or more negligent acts.

2. Where, through overwork and loss of sleep, a motorman failed to observe a rule requiring him to keep 100 feet behind a preceding car, and collided with it, injuring plaintiff, the motorman thereof, the company may not interpose his non-compliance with the rule as a fellow servant's negligence, barring plaintiff's recovery.

3. Where a street car superintendent placed a motorman on

a car about 10 o'clock a. m., and about 4:30 o'clock p. m. the motorman caused a collision, resulting in plaintiff's injury, and the cars were run four miles to another point, where the superintendent came up while employees were stating how the accident occurred, his declaration that he should have known better than to put the motorman on the car was inadmissible as part of the res gestæ.—(Ft. Wayne & Wabash Valley Traction Co. vs. Crosbie, 81 N. E. Rep., 474.)

IOWA.—Negligence—Instructions—Concurrent Negligence—Instructions—Street Railroads—Operation of Cars—Collision with Hack—Action.

1. In an action for injuries in a collision between a coach and a street car, an instruction that if the jury found the owners of the coach and the street railway company were jointly negligent, and were also separately negligent, and that the joint and concurrent negligence brought about the accident and injury, plaintiff could recover, was objectionable, for failure to define what would authorize a finding of negligence either joint or separate.

2. Where, in an action for injuries to a passenger in a coach in collision with a street car, plaintiff charged that both owner of the coach and the street car company were jointly and concurrently negligent, but averred different and specific acts of negligence against each, an instruction that if defendants were jointly negligent and also separately negligent, and the joint and concurrent negligence caused the injury, plaintiff could recover, was erroneous as against the street car company, for failure to present the specific negligence charged against it to the jury, and for failure to define and limit the railroad company's duty in the premises.

3. Where, in an action for injuries to a passenger in a hack by a collision between the hack and a street car, the only negligence of the street car company, if any, was in failing to make a timely stop of the car, and the motorman testified that he used the emergency stop, instead of the brake, an instruction that, if the motorman could have seen the team on the track in a dangerous position, it was his duty to use all the appliances at his command to prevent the collision, and, if he did not do so, the jury might find him negligent, was objectionable, for failure to confine the jury's attention to the question whether in the exercise of reasonable care the car in question could not have been stopped soon enough to have avoided the accident.—(Ramsey vs. Cedar Rapids & M. C. Ry. Co., et al., 112 N. W. Rep., 798.)

KENTUCKY.—Master and Servant—Injury to Servant—Action—Evidence—Similar Facts—Other Injuries from Same Cause—Duty to Provide Safe Place to Work—Duty of Servant to Inspect.

1. In an action against a street railway company for injuries caused to a conductor by coming in contact with a pole at the side of the track, it was error to exclude evidence of a former conductor that his attention had been called to the proximity of the poles to the track by reason of his clothing coming in contact with one of them, and that another conductor had been hit by a pole at the same place at which plaintiff was struck while collecting fares on the running board, since it was competent to show that the poles were too near the track to be safe for the conductor in using the running board in collecting fares.

2. It was the duty of a street car company to furnish its employee with a reasonably safe place to work, and he is not precluded from recovering for an injury caused by a pole in dangerous proximity to the track, unless he had notice of it or it was patent to persons of his experience and understanding.

3. Where it is not in the line of a servant's duty, he is not required to make an inspection of his place of work to discover the defects and dangers incident thereto.—(Finley vs. Louisville Ry. Co., 103 S. W. Rep., 343.)

KENTUCKY.—Carriers—Street Railroads—Negligence—Evidence—Instructions.

1. Where, in an action against a street railway company for injuries to a passenger in consequence of an unhitched horse in the street becoming frightened and running into the car, the evidence of plaintiff showed that the horse was frightened before the car reached it, and that the motorman did not check the speed of the car, and the evidence of the company showed that the car was barely moving at the time it got opposite the horse, and that the motorman, as soon as the horse showed signs of fright, shut off the current, put on the brakes, and that just as the car got opposite the horse it suddenly wheeled

in the direction of the car, an instruction that the company was required to exercise the utmost care for the safety of the passengers, and if the motorman, by the exercise of the utmost care, could not prevent a collision and injury, a verdict should be rendered for the company, properly submitted the issues.—(Wynn vs. Paducah City Ry., 102 S. W. Rep., 824.)

KENTUCKY.—Carriers—Injury to Passenger in Alighting—Negligence of Conductor.

Where, on a dark night, the conductor of an electric car twice announced a station, and then opened the door and went onto the platform, and a passenger, ignorant, though exercising ordinary care, of the fact that the car was still moving, the current having been turned off at the top of a grade and the movement of the car being so smooth that a person would not notice it, followed him onto the platform, passed by him down the steps, and was injured in attempting to alight, the carrier is liable; the conductor having failed to warn her, though he knew her danger, or by the exercise of ordinary care should have known it, and he being bound to know, under the circumstances, that she followed him for the purpose of alighting.—(Blue Grass Traction Co. vs. Skilman, 102 S. W. Rep., 809.)

MASSACHUSETTS.—Street Railroads—Injury to Child on Track—Contributory Negligence—Question for Jury—Gross Negligence—Question for Jury.

1. In an action for the death of a child killed by a street car, whether the child was guilty of contributory negligence in attempting to cross the track held, under the evidence, to be a question for the jury.

2. In an action for the death of a child killed by a street car, whether the motorman was guilty of gross negligence in operating the car held, under the evidence, to be a question for the jury.—(Beale vs. Old Colony St. Ry. Co., 81 N. E. Rep., 868.)

MASSACHUSETTS.—Carriers—Street Railroads—Injuries to Passengers—Negligence—Questions for Jury—Care Required—Evidence—Racks—Custom.

1. Plaintiff was a passenger on an ordinary street car, having seats running lengthwise on each side. As she was leaving the car, she stumbled over a bag which another passenger had placed on the floor, and fell, receiving the injuries complained of. The bag did not obstruct the free passage of plaintiff from the car, and did not render the passageway dangerous to a person exercising due care. Held, that the conductor was not negligent as a matter of law in suffering the bag to be placed and to remain on the floor.

2. In an action for injuries to a street car passenger by falling over another passenger's bag, deposited in the aisle, the court properly refused to charge that the carrier was bound to use the highest possible degree of care and caution to keep the aisles, entrances, and exits of its cars free from obstructions, and to exercise toward plaintiff the utmost care and diligence in providing against those injuries which could be averted by human foresight; the carrier only being bound to exercise the highest degree of care consistent with the practical operation of its business.

3. In an action for injuries to a street car passenger by falling over another passenger's bag placed in the aisle, evidence that it was not customary to have racks for baggage or parcels in street cars, and that it was the custom to allow passengers to put hand baggage and dress-suit cases on the floor, was admissible as bearing on the question whether defendant exercised due care in the premises.—(Pitcher vs. Old Colony St. Ry. Co., 81 N. E. Rep., 876.)

MASSACHUSETTS.—Carriers—Injuries to Passengers—Negligence—Question for Jury—Instructions—Negligence—Violation of Rules—Evidence—Conclusion of Witness.

1. In an action against a street railway company for injuries to a passenger thrown from a car while passing a curve, the question of negligence in running the car at an excessive rate of speed held for the jury.

2. An instruction, in an action against a street railway company for injuries to a passenger thrown from a car running at an excessive rate of speed over a sharp curve, that it was not sufficient to show that the car was going at such speed as to make it probable that there would be a lurch, nor sufficient to show that there was an unusual lurch of the car sufficient to throw a passenger off, but that it must be shown that the speed was so unusual that the servants in charge thereof ought to have realized that the car was likely to lurch more violently

than incident to the ordinary operation of cars on curves, was properly refused; the question of negligence being whether the servants were running the car at a rate of speed which, under the circumstances, involved unnecessary dangers.

3. A violation by employees in charge of a car of the rule limiting the speed of cars while running over curves in the track is a circumstance to be considered in passing on their negligence.

4. To maintain an action against a street railway company for injuries to a passenger thrown from a car while running over a curve in the track, it must appear that the lurch of the car which threw the passenger off was more than is ordinarily to be expected, and that it was due to a defect in the car or track, or a negligent rate of speed, or some other cause for which the company is responsible.

5. A statement of the conductor in charge of a car that, while running over a curve in the track, the car did not lurch more than any of the single-track cars would do, is admissible as a statement of the result of his observation, though it involves his opinion.—(Partelow vs. Newton & B. St. Ry. Co., 81 N. E. Rep., 894.)

MASSACHUSETTS.—Master and Servant—Injuries to Servant—Duty of Master—Fellow Servants—Incompetency—Evidence—Knowledge of Master of Incompetency of Servant—Evidence—Sufficiency—Question for Jury—Instructions—Trial—Requests—Necessity.

1. An employer by the contract of employment impliedly undertakes to provide the employees with suitable appliances and a safe place in which to work and to use reasonable diligence in employing competent fellow servants.

2. Where a servant originally competent becomes during the service incompetent, and the incompetency is known, or in the exercise of reasonable diligence should have been discovered, and the employment is continued, the master's liability is the same as if he had knowingly or negligently hired an incompetent servant.

3. In an action by an employee for injuries caused by the incompetency of a fellow servant, single instances of incompetency of the fellow servant are inadmissible; but his general reputation as a person deficient in skill in performance of his duties is admissible.

4. The knowledge of the assistant superintendent of a street railway company, charged with the duty of supervising the operation of cars, that a motorman was incompetent and would not be able to run a car properly, which knowledge was communicated to the superintendent, must be imputed to the company.

5. An employee, seeking to recover for injuries sustained in consequence of the incompetency of a fellow servant retained by the employer with knowledge of the facts, must not only prove prior incompetency of the fellow servant, of which the employer could have had knowledge, as well as the retention by the employer of an incompetent servant, but also that the accident resulting in the injury complained of was occasioned by such incompetency.

6. In an action by a street car conductor for injuries received in consequence of the incompetency of the motorman operating the car, evidence examined, and held to justify a finding that the accident was due to the motorman's lack of ordinary skill.

7. An employee, seeking to recover from his employer for personal injuries, who introduces testimony from which a single ground of negligence on the part of the employer may be found, is under no obligation to go further.

8. In an action by a street car conductor for injuries sustained in consequence of the incompetency of the motorman in charge of the car, evidence examined, and held, that the question whether the conductor assumed the risk arising from the incompetency of the motorman was for the jury.

9. An instruction, in an action by a street car conductor for injuries caused by the incompetency of the motorman, that the motorman was required to exercise the degree of care called for under the circumstances, and if there had been only one passenger, the conductor, the duty imposed would have been reasonable care with reference to the circumstances, while with reference to passengers the motorman was called on to exercise the highest degree of care consistent with the performance of his duties, was not erroneous, as leading the jury to believe that the conductor was to be considered a passenger, requiring the company to exercise the highest degree of diligence.

10. Where, in an action by a street car conductor for injuries caused by incompetency of the motorman, the company deemed that a charge might have led the jury to consider that the question was one involving the motorman's due care, rather than that of his incompetency, it was the duty of the company to ask for more specific instructions.—(Cooney vs. Commonwealth Ave. St. Ry. Co., 81 N. E. Rep., 905.)

MICHIGAN.—Master and Servant—Injury to Servant—Negligence—Employment of Incompetent Fellow Servant—Evidence—Instructions—Evidence—Admissibility.

1. Where, in an action against a street railway company for injuries to a conductor, struck by a car operated by a motorman on an adjacent track, the only ground of recovery was based on the incompetency of the motorman, of which the company had notice, it was error to instruct the jury that they might consider other claims of negligence in determining whether the company retained in its employ an incompetent motorman.

2. In an action against a street railway company for injuries to a conductor struck by a car operated by a motorman on an adjacent track, the books kept by the company containing records of conductors and motormen, including the motorman in question, were admissible not only to show notice to the company of his record, but also as prima facie evidence of any facts stated therein.—(Trend vs. Detroit United Ry., 112 N. W. Rep., 977.)

MISSOURI.—Trial—Reception of Evidence—Motion to Strike—Necessity—Appeal—Harmless Error—Admission of Evidence.

1. In an action against a street car company for damages caused by a collision, the admission, over objection, of a city ordinance limiting the speed of street cars, which had been repealed unbeknown to the court, was not error, where counsel objected to its admission because he thought it had been repealed, but did not, after such fact was ascertained, move to exclude it from the consideration of the jury.

2. The admission of the ordinance was not prejudicial error, where the cause was not submitted to the jury on the question of negligence in running the cars at a rate of speed prohibited by ordinance.—(Weir et al. vs. Metropolitan St. Ry. Co., 103 S. W. Rep., 583.)

MISSOURI.—Street Railroads—Persons on Track—Death—Contributory Negligence.

1. Plaintiff's intestate, who was engaged in improving a street on which double street car tracks were laid, with knowledge that cars were passing over the track every few minutes, took a position on the east-bound track with his back toward the west, and continued in this employment, without turning his face to the west or giving any attention to the approach of cars, until he was struck by an east-bound car. Held that, in the absence of any claim that the motorman's act in striking intestate was wilful or wanton, or that he was running his car at an excessive rate of speed, intestate's negligence directly contributed to his injury and precluded a recovery.—(Brockschmidt vs. St. Louis & M. R. R. Co., 103 S. W. Rep., 964.)

MISSOURI.—Carriers—Injuries to Passenger—Petition—Sufficiency—Damages—Evidence—Health of Injured Person—Injuries to Person—Excessive Damages.

1. In an action against a carrier for injuries to a passenger, an allegation that defendant, while operating its car at a rapid rate of speed, suddenly and without warning stopped it so as to cause a violent and sudden shock sufficient to throw plaintiff against the car and onto the street, stated a prima facie case of negligence.

2. In an action for injuries to a married woman, her testimony that her family consisted of herself, husband, and five children, and that she took care of the house and family prior to the accident, but had not been able to do so since, was properly admitted for the purpose of showing that she was a healthy woman before her injuries and thereafter incapacitated.

3. Where plaintiff, who was a strong, healthy woman prior to her injuries, capable of taking care of a numerous household, was rendered weak and incapable of labor, had her nose broken, and became a nervous wreck, with her mind weakened, and her sight impaired, and was otherwise injured, a verdict of \$4,500 was not excessive.—(Latimer et al. vs. Metropolitan St. Ry. Co., 103 S. W. Rep., 1102.)

MISSOURI.—Carriers—Street Railways—Injuries to Passenger — Evidence — Instructions — Evidence—Verdict—Evidence.

1. Proof that, while plaintiff was a passenger on one of defendant street railway's cars, it collided with another car on the same track, whereby plaintiff was injured, made out a prima facie case of negligence on defendant's part.

2. In an action against a street railway for injuries received by plaintiff in a collision, an instruction that, if plaintiff received his injuries as the result of some occurrence which careful men in the situation of defendant's agents would not have reasonably anticipated, then such occurrence is what, in law, is termed an "accident," and defendant was not liable, was misleading; an accident being something unexpected and unavoidable.

3. In an action against a street railway for injuries received by plaintiff in a collision between the car on which he was a passenger and another car, evidence examined, and held sufficient to show that a break in an air brake was caused by the collision and was not the cause thereof.

4. In an action against a street railway for injuries received by plaintiff in a collision between the car in which he was a passenger and another car, a verdict for defendant held against the weight of the evidence.—(Hunt vs. Metropolitan St. Ry. Co., 103 S. W. Rep., 1088.)

MISSOURI.—Death—Action for—Measure of Recovery—Statutory Provisions—Instructions.

1. Where, in an action against a street railway for wrongful death resulting from the negligence of defendant's servants, the allegations of the petition, other than the amount sued for, which was \$4,500, brought the case within the purview of Rev. St. 1899, Section 2864, providing that for every such death defendant shall forfeit and pay \$5,000, an instruction authorizing the jury, in case they found for plaintiff, to assess the damages at \$4,500, was error; it being necessary to demand in the petition the full amount provided by the statute.—(Gormley et al. vs. St. Louis Transit Co., 103 S. W. Rep., 1147.)

MISSOURI.—Street Railroads—Collision with Vehicle—Contributory Negligence—Driver of Vehicle—Actions for Injuries—Sufficiency of Evidence.

1. It is not the duty of a teamster's helper to see that the teamster acts prudently, in the absence of knowledge or reason to believe that he is not a careful driver or prudent man. Hence he is not guilty of contributory negligence, where he is injured on account of a street car running into the wagon in which he was riding while the teamster was driving.

2. In an action for personal injuries caused by a street car running into the wagon in which plaintiff was riding, evidence considered, and held sufficient to sustain a verdict for plaintiff on the theory that the motorman was negligent.—(Agnew vs. Metropolitan St. Ry. Co., 102 S. W. Rep., 1041.)

MISSOURI.—Evidence—Opinion—Evidence—Physical Condition—Damages—Physical Injury—Question for Jury—Trial—Instructions—Applicability to Pleadings.

1. In an action for injuries caused by being thrown from a street car, a physician, when asked in what condition he found the injured party the next day, stated: "I found him pretty badly shook up and bruised up. * * * He was suffering in the hip and back, and generally shook up. * * *" Held, that the statement that the person was suffering in the hip and back was not incompetent as being based on hearsay or mere opinion.

2. In an action for injuries caused by being thrown from a street car, evidence that plaintiff's suffering from rheumatism was occasioned by the injury examined, and held sufficient to go to the jury on the question of damages.

3. Where, in an action for personal injuries, the petition did not allege that the injured person was suffering from rheumatism prior to the injury, but alleged that he became afflicted with it as a result of the injury, and evidence that he had suffered with it prior to the injury was introduced without objection that it was not proper under the petition, it was not error for the court to instruct the jury to a continuation of that affliction.—(Detrich vs. Metropolitan St. Ry. Co., 102 S. W. Rep., 1044.)

MISSOURI.—Trial—Issues—Question for Jury.

Where, in an action for injuries to a passenger as she was attempting to alight from a street car, plaintiff's evidence that the car was suddenly started as she was attempting to alight, after it had come to a full stop, was corroborated by the

physical facts, whether she was injured in the manner claimed or in attempting to alight in an improper manner before the car had come to a stop, as defendant claimed, and as testified by seven eyewitnesses of unimpeached veracity, though not necessarily free from bias, was for the jury.—(Pickens vs. Metropolitan St. Ry. Co., 103 S. W. Rep., 124.)

MISSOURI.—Street Railroads—Leases—operation by Lessee—Liability of Lessor—Same—Collisions—Contributory Negligence—Question for Jury—Negligence—Injuries Avoidable Notwithstanding Contributory Negligence—Trial—Demurrer to Evidence—Effect—Collision with Vehicle—Question for Jury—Evidence—Instructions.

1. Where a street railway company, pursuant to legislative authority, leased its railway to another company which agreed to pay rent and to operate the railway, the former company was not liable for damages sustained in a collision between a vehicle and a car operated by the latter company.

2. A driver of a team and wagon, who looked and listened for a car prior to going on a street car track, and who neither saw nor heard a car, was not negligent as a matter of law for not looking for a car within a minute thereafter while driving 470 ft. along the track.

3. A street railway company is liable for injuries sustained by a collision between a vehicle and a car, where the employees in charge of the car by the exercise of ordinary care could have avoided the accident, notwithstanding the negligence of the driver in the first instance in placing himself in a situation of peril.

4. A demurrer to the evidence by operation of law admits the facts proved.

5. In an action against a street railway company for injuries caused by a collision between a vehicle and a car, evidence examined, and held that the question of the negligence of the employees in charge of the car in failing to exercise ordinary care to avoid the accident on the discovery of the peril of the driver was for the jury.

6. Where, in an action against a street railway company for injuries caused by a collision between a vehicle and a car, there was no evidence authorizing an inference that the negligence of the driver of the vehicle contributed to the injury after the employees in charge of the car either saw or by the exercise of ordinary care could have seen his perilous situation, instructions that if the motorman in charge of the car saw or by the exercise of ordinary care could have seen the vehicle on the track and in a position of peril in time to have avoided the collision by the exercise of ordinary care, and he nevertheless negligently permitted the car to run against the vehicle, the verdict should be for plaintiff, was not erroneous for failing to require the jury to find that plaintiff was exercising ordinary care after going on the track and before the collision.—(Bensiek vs. St. Louis Transit Co. et al., 102 S. W. Rep., 587.)

MISSOURI.—Carriers—Injury to Passenger—Proximate Cause of Injury—Trial—Instructions—Necessity of Request.

1. Where a street car conductor, in passing from a trailer to the grip car, neglected to hook into its place a chain, which performed the office of a gate between the trailer and grip car, and a passenger who was standing on the platform of the trailer, on a sudden jerk of the car, was thrown forward so that he fell through the open place where the chain should have been, whereby he was injured, the absence of the chain, and not the jerk of the car, was the proximate cause of the injury.

2. Failure to instruct on the issue of negligence, such issue not being embraced in the instructions asked by counsel, amounted to mere non-direction, not constituting error.—(Hooper vs. Metropolitan St. Ry. Co., 102 S. W. Rep., 58.)

MISSOURI.—Evidence—Admissions—Competency—Appeal—Review—Admission of Evidence—Objection Not Raised on Motion for New Trial—Exceptions Not Reserved—Witnesses—Examination by Court—Disclosure of Opinion as to Veracity—Carriers—Street Railways—Stops—Binding Effect Upon Passengers—Damages—Personal Injury—Deafness Caused by Nervous Shock—Trial—Instructions—Necessity for Request.

1. Plaintiff, in an action for injury received by the premature starting of a street car while she was alighting at a point between cross streets, admitted on cross-examination that she had stated in a deposition that the car did not stop at all, but

explained that she was confused and misunderstood; that she meant the car did not stop at the last street passed before she got off, for which she had signaled a stop. Held, that it was improper to exclude the notary's testimony that plaintiff stated several times in her deposition that the car was not stopped at all.

2. Defendant's exception to the admission of evidence is not reviewable, where the admission of incompetent or irrelevant evidence was not stated as a ground for new trial; a ground that the verdict "is against the law" being insufficient to comprehend an erroneous ruling on the admission of evidence.

3. Defendant cannot base error on questions asked a witness, where no exceptions were taken thereto, though objections were made; and it makes no difference that defendant might have prejudiced its case before the jury had it stated the reasons for the objection and excepted to the court's action.

4. Though a trial judge may question a witness, his examination should be guarded so as not to give even a hint of his opinion as to the witness's veracity, or any impression he may have as to the merits of the case.

5. If a conductor stops a car in violation of a company's rule prohibiting stops between cross-streets at a passenger's request to allow her to alight, and while she is alighting the car starts, causing her injury, the rule affords no defense, for the conductor is the company's vice principal for the time, and the company is liable for his acts in negligently starting the car.

6. Plaintiff's deafness, resulting from a nervous shock received when injured, is a proper element of damages.

7. If plaintiff's deafness, resulting from a nervous shock received when injured, was not a proper element of damages, where the court instructed that on a verdict for her she was entitled to compensation for such injury as she received and for such pain of body and mind as she suffered as a direct result of the injury, if defendant desired to have the element of deafness eliminated from the estimate of damage, it should have asked an instruction to that effect.—(Dreyfus vs. St. Louis & S. Ry. Co., 102 S. W. Rep., 53.)

MISSOURI.—Carriers—Street Railways—Injury to Passenger—Pleading—Stopping Places—Opportunity to Alight—Sufficiency—Appeal—Review—Harmless Error—Trial—Instructions—Issues Not Sustained by Proof—Objections to Questions—Scope—Unresponsive Answers.

1. In an action for injury to a passenger while alighting from a street car, plaintiff's omission to plead that the car stopped at a regular station did not restrict proof to a stop at a point other than a regular stopping place.

2. Where one in charge of a street car knows a passenger is alighting, the duty to him is the same whether the stop is made at a regular stopping place or not.

3. A street car conductor has no right to assume because the car has been stopped for a time reasonably sufficient to enable passengers to alight that they have alighted, but is charged with the duty to see that no one is in the act of alighting when the car starts.

4. In an action for injury to a street car passenger while alighting, any error in an instruction in including in the hypothesis upon which she could recover the fact that the car was started before she had "a reasonably sufficient time to leave said car" was against her, and harmless to defendant.

5. In an action for personal injury, it was not error against defendant to instruct on contributory negligence, though there was no evidence tending to show plaintiff's negligence, where defendant pleaded contributory negligence and did not attempt to withdraw that issue.

6. An objection to a question merely advises the court that the propriety of the question and of a responsive answer thereto is put in issue, and does not reach unresponsive statements included in the answer, which may only be put in issue by motion to strike out.—(Murphy vs. Metropolitan St. Ry. Co., 102 S. W. Rep., 64.)

MISSOURI.—Carriers—Injury to Passenger—Question for Jury.

In an action by a passenger for personal injuries sustained in striking his foot against certain pieces of iron on the platform, on account of a jerk of the train while he was getting on the car, where there was no evidence that the pieces of iron were deposited, or permitted to be deposited, on the platform by defendant's employees, it was error to submit that question to the

jury in an instruction.—(Price vs. St. Louis Transit Co., 102 S. W. Rep., 626.)

MISSOURI.—Carriers—Care to Protect Passengers—Negligence—Presumptions—Pleadings—Evidence—Instructions—Protection of Passengers—Care Required.

1. Operators of a street car in the discharge of their duty to a person boarding it to become a passenger should either hold it at rest until the passenger has been given a reasonable time in which to seat himself, or, when there is no vacant seat, to reach a place where he may support himself while standing, or, if they start the car before the passenger has reached a place of safety, the start must be gradual to avoid the danger of throwing him down.

2. Operators of a street car who make a sudden start of the car of sufficient violence to injure a passenger proceeding with reasonable care to reach a place of security are presumptively negligent, and the presumption becomes conclusive unless it is shown that the manner of starting the car was unavoidable in the exercise of the highest degree of care.

3. Where, in an action against a street railway company, the petition charges, and the evidence of plaintiff shows, that she was thrown by a sudden and violent start of the car made when she was stepping onto the foot board to become a passenger, and the evidence of the company showed that the car did not stop and plaintiff made no attempt to board it, and the jury were told that a recovery could be had on no other ground than that plaintiff was thrown from the foot board before she had time to secure her footing, an instruction authorizing a recovery if the car was suddenly started without allowing plaintiff a reasonable time to board it and become seated thereon was not objectionable as charging, as a matter of law, that it was the duty of the company to hold the car stationary until plaintiff had been given a reasonable time in which to seat herself.

4. Where an open car with a foot board along each side of it for use of passengers in boarding it stopped at a regular stopping place for the reception of passengers, it was the duty of the conductor, before giving a signal to start, to look to see that no one was in a position to be injured should the same be started, and he had no right to assume from the fact that the car had been stationary a time reasonably sufficient to transact the business at that point that no one would be endangered by starting it.—(Miller vs. Metropolitan St. Ry. Co., 102 S. W. Rep., 592.)

MISSOURI.—Street Railroads—Injuries to Travelers—Collision with Fire Truck—Negligence—Question for Jury—Contributory Negligence—Negligence—Imputed Negligence—Driver of Vehicle—Street Railroads—Collision of Vehicles—Issues and Proof—Damages—Excessiveness—Injuries.

1. Where, in an action for injuries to a fireman in a collision between a hook and ladder truck and defendant's street car, there was evidence that the speed of the car was much too high to prevent a timely stop of the car after danger to the truck became apparent, and that with any proper use of the appliances at the motorman's command, after the peril arising from the truck could have been discovered, the car might have been stopped, such facts were sufficient to require submission of the issue of defendant's negligence to the jury.

2. Plaintiff, while returning from a fire on a fire truck, was injured in a collision between his truck and an approaching street car. Plaintiff was not driving, and only saw the car when 50 ft. away by looking over the top of the truck, after which he attempted unsuccessfully to get away. Held that it was not incumbent on plaintiff to keep a vigilant watch for cars, and that he was not negligent as matter of law.

3. Where plaintiff, a fireman, was riding as a passenger on a fire truck which was being driven home from a fire, and plaintiff had no control over the driver of the truck, the latter's negligence was not imputable to him.

4. Where a petition in an action for injuries to a fireman in a collision between a street car and a fire truck charged that the motorman was negligent in running the car at a speed in excess of the rate fixed by a city ordinance so as to be dangerous to persons lawfully using the street, a finding of negligence because the speed of the car exceeded the ordinance limit, and in consequence of such high speed the car collided with the truck, was within the scope of the petition.

5. Plaintiff, a fireman, was injured in a collision between his fire truck and a street car. He was under treatment four or five months, and was more or less disabled. His right leg was broken, his left foot crushed so as to interfere with his move-

ments, and he received a head wound and bruises on his thigh. He also expended \$215 for attendance. Held that a verdict allowing plaintiff \$4,000 was not excessive.—(Burleigh vs. St. Louis Transit Co., 102 S. W. Rep., 621.)

NEW YORK.—Damages—Personal Injury—Loss of Profits.

In an action for personal injury, plaintiff could not recover for loss of profits in a lunch business; it not appearing that it required any particular skill to manage it, that he had any particular skill in serving food, or that the business could not have been continued by the employment of help until he could supervise it, but the testimony should have been confined to the value of his individual services.—(Weir vs. Union Ry. Co. of New York City, 81 N. E. Rep., 168.)

NEW YORK.—Appeal—Review—Evidence — Presumptions — Trial—Questions for Jury.

1. Where the complaint was dismissed on plaintiff's evidence alone, the testimony is entitled on appeal, not only to belief, but to all favorable inferences that can reasonably be drawn therefrom.

2. In an action for personal injuries caused by starting a car from which plaintiff was alighting, where plaintiff established prima facie that he was free from contributory negligence and that the defendant was negligent in starting the car as it did, it was error to dismiss the complaint.—(Klein vs. New York City Ry. Co., 103 N. Y. Sup., 751.)

NEW YORK.—Carriers—Injuries to Passengers—Street Railroads—Evidence.

Where, in an action for injuries to a street car passenger, the only evidence that defendant operated the cars on the line on which plaintiff was injured was a transfer slip bearing defendant's name, which transfer slip defendant's superintendent testified was issued by another railroad company, and not by defendant, plaintiff was not entitled to recover.—(Dista vs. Westchester Electric R. Co., 103, N. Y. Sup., 738.)

NEW YORK.—Carriers—Injuries to Passengers—Proof of Negligence.

In an action for injuries to a passenger on a street car, where it was shown that the car, while being driven rapidly on a curve, left the track, whereupon plaintiff was thrown from the platform into the street, receiving the injuries complained of, it was error to dismiss the complaint for failure of proof of defendant's negligence.—(Ludinsky vs. Dry Dock, E. B. & B. R. Co., 103 N. Y. Sup., 711.)

NEW YORK.—Carriers—Passengers—Actions for Injuries—Questions for Jury.

1. In an action for injury to a passenger on a street car, due to the starting of the car before she had reached a place of safety, it was not essential to plead or prove the manner in which the car was started, and failure to prove an allegation that the car started with a jerk was not fatal to the action.

2. Where it was shown that plaintiff, a woman 77 years old, after taking a street car, was thrown, without stumbling, but purely by the motion of the car in starting before she could reach a place of safety, to the floor, and injured, the question of the negligence of defendant's servants in so operating the car was properly for the jury.—(Morrow vs. Brooklyn Heights R. Co., 103 N. Y. Sup., 998.)

NORTH CAROLINA.—Carriers—Negligence—Injuries to Passenger—Evidence—Burden of Proof—Instructions.

1. In an action against a street railway for injuries received by a passenger from a derailment of defendant's car, evidence that other cars ran off the track at the place of the derailment was inadmissible, without proof that the track was in the same condition as at the time when the accident in question occurred.

2. In an action against a street railway for injuries to a passenger from derailment of defendant's car, an instruction that proof of the derailment raised a presumption of negligence on defendant's part, with a further instruction that if there was negligence, and such negligence was the proximate cause of the injury, plaintiff was entitled to recover, was proper.

3. In an action against a street railway for injuries to a passenger from a derailment of defendant's car, an instruction that, if the jury found from the evidence that such derailment was the result of a mere accident or the motion of the power ordinarily incident to cars while running at an allowed rate of speed, then defendant would not be guilty of negligence, put on defendant the burden of showing that the derailment was accidental, and

was not open to plaintiff's exception.—(Overcash vs. Charlotte Electric Ry., Light & Power Co., 57 S. E. Rep., 377.)

PENNSYLVANIA.—Street Railways—Injury to Pedestrian—Contributory Negligence.

Where a person attempted to cross defendants's street car tracks, and was struck by a car which he intended to take, and he could have taken but one or two steps from the time he entered on the line of the track until the car caught him in the space between the rails, he was guilty of contributory negligence barring recovery.—(Crooks vs. Pittsburg Railways Company, 66 Atl. Rep., 142.)

RHODE ISLAND.—Damages—Evidence—Admissibility—Grounds—Direct Consequences—Physical Suffering—Trial—Waiver of Right to Object to Introduction—Proceedings for Assessment—Instructions—Mitigation.

1. In an action for personal injuries, where plaintiff alleged injury to the internal organs and specific notice that pelvic injury was claimed was given to defendant's surgeon, and immediately reported to its counsel, evidence of pelvic injury was properly admitted.

2. In an action for personal injuries received by being thrown from a street car, an injury to the shoulder was a proper element of damages, whether caused directly by the fall or by the ligating of the arm after the fracture was reduced, since it was a natural result of the accident.

3. Where, in an action for personal injuries, the question of the permanence of the injury was the subject of extended cross-examination, the defendant, thereby waived any valid objection to the introduction of the life tables by plaintiff.

4. In an action for personal injuries, the court properly instructed that the plaintiff must do all that a reasonable person would do to reduce her injuries, and, if she has failed or refuses to do this, defendant would not be liable for the increase of injury, due to her negligence, but, if she puts herself into the hands of the physicians and follows their advice, defendant would be liable even though the physicians lack in skill or err in judgment.—(O'Donnell vs. Rhode Island Company, 66 Atl. Rep., 578.)

RHODE ISLAND.—Carriers—Injuries to Passengers—Negligence—Res Ipsa Loquitur—Question for Jury—Damages—Personal Injuries—Nature and Extent of Injuries—Evidence Expert Witnesses—Opinion Evidence—Admissibility—Appeal—Harmless Error—Overruling Improper Questions Asked a Witness—Physical Suffering Caused by Fright—Trial—Instructions—Refusal to Give Instructions Embodied in Those Given—Injuries to Child—Expenses Incurred.

1. Proof of a collision between two street cars operated by the same company injuring a passenger on one of them raises a presumption of negligence of the company, placing the burden of proving freedom from negligence on it.

2. Where, in an action by a street car passenger for injuries in collision with another car, the passenger proved the collision and injuries, and the company gave evidence in explanation of the collision, the question whether the presumption of negligence was overcome by the company's evidence was for the jury.

3. Where, in an action for personal injuries, the evidence of the nature and extent of the suffering of the person injured, and whether the suffering was a result of the accident, or was due to her previous physical conditions, was conflicting, the question whether the person injured was injured as a result of the accident complained of was for the jury.

4. In a personal injury action, a question asked a physician, based on his observation of the person injured as to the time of her ultimate recovery, is properly allowed.

5. Where a physician, in a personal injury action, in response to a question calling for his opinion as to the time of the ultimate recovery of the person injured, stated that he could not tell, the error, if any, in admitting the question was harmless.

6. While recovery cannot be had for mere fright caused by negligence of another, yet where fright is followed by physical ills, or gives rise to nervous disturbances and those in turn to physical troubles, an action will lie.

7. Instructions are properly refused where they are sufficiently covered by the charge as given.

8. A parent suing for injuries to a minor child may recover the expenses incurred in nursing the child which are in excess of the ordinary services the parent is bound to render to a minor child.—(Simone vs. Rhode Island Company, 66 Atl. Rep., 202.)

FINANCIAL INTELLIGENCE

WALL STREET, Nov. 6, 1907.

The Money Market

The developments in the money market during the past week have been decidedly mixed. Following the suspension of several trust companies and state banking institutions a fortnight ago, heroic efforts have been made by the leading bankers and financiers to bring about a restoration of confidence, and while they have been partly successful in their undertaking, still the situation as a whole cannot be said to be at all encouraging. The heavy liquidation in the securities markets greatly reduced the demand for money for stock market purposes, but at the same time it was practically impossible for borrowers to obtain needed requirements except by paying unusually large premiums. As a matter of fact, the banks and trust companies have been absolutely out of the money market, leaving the demands of borrowers to be supplied by pools and by individuals who were willing to put out their funds on stock collateral. Money on call loaned as high as 100 per cent, and as low as 3 per cent, the average rate for the week being about 50 per cent. It was absolutely impossible to negotiate loans for fixed periods, and borrowers, as a rule, withdrew their bids, fully realizing the impossibility of securing accommodations. For the first time since 1893 the Clearing House Association was compelled to issue Clearing House certificates to enable certain institutions to settle their daily balances. This action by the New York banks was followed by similar action in Boston and many Western cities. For the first time since 1893 currency in this city was quoted at a premium, the rate at times ruling as high as $2\frac{1}{2}$ @ 3 per cent per \$100. In many instances comparatively small concerns were compelled to pay their employes in checks, so great was the scarcity of bills of small denominations. A feature of the week has been the complete demoralization in the foreign exchange markets, bankers at times finding it impossible to sell bills at any reasonable price. Prime demand sterling bills have sold as low as 4.82 and cables at 4.83 @ 4.83 $\frac{1}{2}$. At the low level our bankers were able to negotiate successfully for gold in Europe, and notwithstanding a subsequent sharp advance in sterling to the highest rates of the year, gold continues to be engaged for import to this side. Within the past ten days approximately \$37,300,000 gold has been engaged in London, and in well-informed quarters it is believed that fully \$50,000,000 will be secured on this movement. The demand for gold in New York has already alarmed financiers at London and Berlin, the result being an advance in the Bank of England rate of 1 $\frac{1}{2}$ per cent to 6 per cent, while the Imperial Bank of Germany has advanced its rate to 6 per cent in order to keep their supplies of gold intact. Unless further advances in the discount rate are made, local bankers are confident that they will be able to draw additional amounts of gold from the other side. One gratifying development of the week has been the announcement that the Bank of France was perfectly willing to part with some of its gold in order to relieve the money stringency at this center.

The bank statement, which was withheld until after business hours on last Saturday, made a most remarkable showing: Loans increased \$60,741,600, to \$1,148,452,600, and deposits increased \$28,014,900, to \$1,051,786,900. This shows an excess of loans over deposits of about \$96,500,000. The cash holdings of the banks decreased \$30,601,800, and as the reserve required was \$7,003,725 larger than in the preceding week, the deficit was increased by \$37,605,525, making the total deficit \$38,838,825 under lawful requirements. In the corresponding week of last year there was a surplus of \$3,049,775, and in 1905 the surplus was \$2,354,475.

The Stock Market

Wall Street during the week just ended passed through a stress of developments that have exceeded in importance everything ever before recorded in its history. The one great factor that dominated all business in the financial districts was the most acute

money famine the country has ever known. With the start of the week the scarcity of money was so intense that banks were forced to issue Clearing House certificates in order to settle daily balances of their accounts with each other. This is the fifth time such an action was taken by the Clearing House banks, but at no time was the action so universally followed wherever there are banking institutions in all parts of the United States. In fact, banking operations were forced to such a point that legal holidays by the governors of many of the Western States in order to prevent financial institutions there from being forced actually to suspend business. For many days it was impossible to obtain cash for checks in Nevada, California, Oregon and Washington, but the same impossibility to draw currency from the banks prevailed even in New York City, and not even enough cash could be obtained in the banking institutions in this city to meet payrolls of employes. The full story of the money famine will, perhaps, never be told. Money in the latter part of last week sold at a higher premium than in 1893, and the market situation developed into a condition where it was useless for holders of stocks to sell their securities, as they would only change their position as stockholders to that of creditors at banks. Because of this the stock market operations have for many days been restricted to forced liquidation due to the curtailment of loans by the banks on the one hand, and to investment buying of stocks on the other. The Stock Exchange is now, and has been for some time, no longer a speculative field. It is simply a place where the actual holders of securities who are forced to sell find the market in actual cash buyers. To a great extent this buying has been in fractional lots, but the number of fractional lots traded in has not been reflected in the printed reports of the Exchange. This fractional lot business has been long ago reduced to a system. Certain houses have assumed the position of supplying the fractional lot demand, and these houses buy in hundred or thousand-share lots and then split the certificates received as needed to meet the requirements of the scattered buyers. On Monday there was buying of a different character. All Sunday and until 5 o'clock on last Monday morning a number of the highest financiers in New York City were held in conference. The course of the market on Monday indicated that this conference had been productive of great results, although at the opening on that day the air was full of stories of impending panic and extreme disaster, and prices in the first few minutes showed serious losses from those of the preceding Saturday, and it was soon demonstrated that a buying power had been developed, and steadily until the close the supply of stocks was absorbed, always at continually advancing prices. The buying itself created a belief that the financial interests represented at the meeting had joined hands, and Wall Street gossip had it that an important pool had been formed to support the market and prevent any further movement to lower prices. There was also a general understanding that seemed to be confirmed during the day that the Tennessee Coal & Iron stock, the carrying of which is supposed to have been a burden on some of the financial institutions, had been taken over on private terms by the United States Steel Corporation. Without any such agreement and without the need of assistance from any bankers' pool, there was ample reason for the sudden development of strength in the market. From the time that the necessities of the financial situation had impressed themselves upon bankers here and in Europe there has been a constant accumulation of gold on the other side of the Atlantic for shipment to this city to relieve the bank's needs. Already importations of gold amounting to \$37,300,000 have been arranged for, almost one-quarter of which left England a week ago to arrive in time to be available for the payment of all stocks bought on Monday, the Election Day interval just giving buyers a lapse of one day between the purchase of the stock and the time for which it would have to be paid. This in itself must be regarded as one of the chief incentives for the upward movement on Monday without the necessity of any secret banking agreement.

The traction issues have moved in sympathy with the general market. Third Avenue stock and bonds were particularly weak, the first named selling at 20, by far the lowest price on record, while the 4-per cent. bonds sold below 40. The declines in these issues followed the announcement that the stock will be defaulted on Jan. 1.

Philadelphia

The developments in the general financial markets at New York and all of the principal centers were reflected in the local securities market during the past week, and naturally the traction issues suffered accordingly. At no time was the volume of business heavy, and all things considered, price fluctuations were moderate. Philadelphia Rapid Transit was the active feature of the week, several thousand shares of which changed hands at from 17 to 16. Union Traction declined in sympathy with B. R. T., the price yielding from 47 to 45½, but later it recovered to 46. Philadelphia Traction was the weakest issue of the group, the stock sustaining a net loss of 2 points to 83. Consolidated Traction of New Jersey, after selling at 55, advanced to 56½, but subsequently there was a reaction of 1¼ points to 55¼. Philadelphia Company common sold at 34½ and at 34, and the preferred at 37. American Railways lost a point to 45, and Fairmont Park Transportation sold at 9.

Baltimore

Trading in the Baltimore traction issues was fairly active and prices showed very little change from those prevailing at the close of last week. In the early dealings there was rather heavy selling of United Railway 4s, which carried the price from 79¾ to 79, but at the low figure good buying developed and resulted in a recovery to 79½. The income bonds sold at 43, and the refunding 5 per cent bonds at 67¼ to 68. The common stock was fairly active at 8¾ @ 9. Baltimore City Passenger 5s sold at 102, Washington City & Suburban 5s at 97, and Lexington Street Railway 5s at 96.

Other Traction Securities

The market for traction stocks at Boston was comparatively quiet, and while prices displayed more or less irregularity, the net changes were generally confined to the fractions. Boston Elevated held steady at 120. West End common sold at 80 and the preferred at 98 @ 97¾. Massachusetts Electric sold at 9¾ @ 10, and the preferred, after an early decline to 37, advanced sharply to 39. Boston & Worcester preferred sold at 60. There were no important developments in the Chicago traction situation during the past week and none are expected until the money and financial markets assume normal conditions. Trading in the local traction issues has been extremely light, and price changes were unimportant.

Trading on the Cleveland Stock Exchange has reflected the conditions that prevail over the country to some extent. Cleveland Electric reached 40 and several blocks of stock were sold at 40 and 41. Northern Ohio Traction & Light changed hands at 19½ and 19¾, a low figure for that security. For future delivery several large blocks of Cleveland Electric were taken at 42 and 43. The result of the election will have everything to do with the future of this stock and will perhaps have its effect on the stocks of companies in other cities where the street railway question has been made a political issue. Aurora, Elgin & Chicago preferred varied between 69 and 70, while Washington, Baltimore & Annapolis Pooling certificates were quoted at 10.

Security Quotations.

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

	Oct. 30.	Nov. 6.
American Railways	—	—
Boston Elevated	a124	a120
Brooklyn Rapid Transit.....	37½	32½
Chicago City	150	150
International Traction (common)	a47	a45
International Traction (preferred) 4s.....	a60	a59¼
Cleveland Electric	—	40¼
Consolidated Traction of New Jersey.....	54	55½
Detroit United	36	32½
Interborough-Metropolitan	5½	5¼

Interborough-Metropolitan (preferred).....	15½	16½
International Traction (common).....	a47	a45
International Traction (preferred) 4s.....	a60	a59¼
Manhattan Railway	111	105
Massachusetts Elec. Cos. (common).....	a10	10¼
Massachusetts Elec. Cos. (preferred).....	37	39½
Metropolitan Elevated, Chicago (common).....	21	21
Metropolitan Elevated, Chicago (preferred).....	50	50
Metropolitan Street	a35	29
North American	51½	44
North Jersey Street Railway.....	40	40
Philadelphia Company (common).....	36	33½
Philadelphia Rapid Transit.....	16¼	16
Philadelphia Traction	85½	85
Public Service Corporation certificates.....	53	54
Public Service Corporation 5 per cent notes.....	89	90
South Side Elevated (Chicago).....	69	69
Third Avenue	25	19½
Twin City, Minneapolis (common).....	83¾	73
Union Traction (Philadelphia).....	46½	46¼

a Asked.

The *Iron Age* says: It is amazing how swiftly the iron trade is adjusting itself to the conditions created by the happenings in the money markets. Plants are shutting down right and left, or are reducing their output. A large number of furnaces have shut down or are about to do so; coke ovens and steel plants have been stopped partially or wholly and the rolling mills are reducing their output. During the week there have been a number of conferences among makers in different lines looking toward harmony of action in meeting the sudden contingencies which have arisen. The copper market has developed considerable action, the large producers reporting a heavy demand both from domestic and foreign consumers. The demand from the latter source is still heavy, the exports of copper metal for the month of October being the second largest on record. Prices are quoted higher at 14¼ @ 14½c. for Lake and 14 @ 14½c. for electrolytic.

“L” TRAFFIC IN CHICAGO

Each of the three Chicago elevated railroads reporting its traffic for October showed an improvement over last year, as well as the preceding month of this year. In percentage of gain the South Side Company led with more than 35 per cent. The Northwestern Company made an unusually good exhibit with a daily average of 108,806, the best of any month in the history of the road. The same was true of the Metropolitan and South Side Companies, except the record made by the latter during the Chicago City Railway strike. The elevated properties are doing unusually well, and the price of their securities fails to reflect the good business which the roads are enjoying. The figures follow:

SOUTH SIDE ELEVATED			
	1907	1906	Increase Per Cent
January	92,411	92,406	5 0.00
February	96,094	95,077	1,017 1.07
March	100,226	95,466	4,760 4.98
April	103,152	95,756	7,396 7.72
May	109,880	91,759	12,721 13.93
June	115,686	101,770	19,986 19.67
July	111,933	92,796	19,187 20.39
August	113,847	88,539	25,308 28.58
September	118,256	89,749	28,507 31.74
October	126,670	93,577	33,093 35.36
METROPOLITAN ELEVATED			
January	150,165	129,720	20,445 15.76
February	154,444	135,570	18,874 13.91
March	154,790	138,169	16,621 12.02
April	156,275	137,477	18,798 13.67
May	151,423	136,735	14,688 10.72
June	148,518	133,974	14,544 10.85
July	135,779	123,370	12,409 10.37
August	136,517	123,512	13,005 10.52
September	140,979	126,975	14,004 11.02
October	157,080	142,671	14,409 10.09
NORTHWESTERN ELEVATED			
January	88,632	81,204	7,428 9.15
February	88,435	83,572	4,863 5.81
March	89,344	85,154	4,190 4.92
April	99,134	84,244	14,890 17.69
May	94,204	81,748	12,456 15.24
June	99,051	80,165	18,886 23.56
July	91,542	73,308	18,234 24.87
August	93,174	73,170	20,004 27.32
September	97,447	77,508	19,939 25.72
October	108,806	88,344	20,462 23.16

REPORT OF MONTREAL STREET RAILWAY FOR THE YEAR

The Montreal Street Railway Company's full pamphlet report for the year ended Sept. 30, 1907, shows, as follows:

	1907	1906
Gross receipts	\$3,503,643	\$3,100,487
Operating expenses	2,104,653	1,850,720
Net earnings	\$1,398,990	\$1,249,767
Received from Park & Island Railway.....	55,101
Total net	\$1,454,091	\$1,249,767
Fixed charges	585,250	546,064
Surplus	\$868,841	\$703,703
Dividends and insurance fund.....	793,100	700,000
Surplus	\$75,741	\$3,703

The general balance sheet as of Sept. 30, 1907, compares as follows:

ASSETS		
	1907	1906
Road construction and equipment.....	\$9,425,754	\$8,392,547
Stores	421,177	347,311
Real estate and buildings.....	2,086,086	1,973,810
Accounts received	111,832	70,607
Park & Island Railway advertising.....	250,619	215,664
Montreal Terminal advertising.....	41,137
Cash	309,886	40,202
Fire insurance fund.....	370,153	266,000
Stocks and bonds of other companies.....	3,200,906	1,572,399
Total	\$16,217,555	\$12,878,540
Capital stock	\$8,829,590	\$7,000,000
Bonds	2,566,368	2,509,368
Bank of Montreal loan.....	500,000	1,483,975
Accounts and wages payable.....	190,972	396,354
Accrued interest	50,002	34,568
Accrued tax	224,489	187,235
Employees' securities.....	16,377	15,371
Unclaimed dividends	1,957	1,957
Unclaimed tickets	44,357	37,874
Bills payable	1,010,030
Suspense account	204,620	163,007
Dividends payable	213,000	175,000
Fire insurance fund.....	381,451	341,245
Contingent account	11,637	7,817
Surplus	2,365,792	524,770
Total	\$16,217,555	\$12,878,540

Included in the Montreal Street Railway's report is the report of the Montreal Park & Island Railway Company, owned by the Montreal Street Railway Company. The income account for the year ended Aug. 30, 1907, compares as follows:

	1907	1906
Gross receipts	\$262,814	\$218,604
Operating expenses	180,931	155,142
Net earnings	\$81,883	\$63,462
Counting for renewals.....	26,714	59,000
Net Inc.	\$55,169	\$13,462
Charges and C. pf.	125,018	121,488
Deficit	\$69,849	\$108,026

Montreal Park & Island Railway's general balance sheet as of Aug. 31, 1907, compares as follows:

ASSETS		
	1907	1906
Cost of road and equipment.....	\$2,328,197	\$2,264,468
Office change fund	2,000	2,000
Accounts receivable	1,438	2,048
Profit and loss	862,926	793,977
Contingent account	9,218
Total	\$3,194,560	\$3,070,810
LIABILITIES		
	1907	1906
Preferred stock.....	\$315,000	\$315,000
Common stock	720,900	720,900
Bonds	1,025,000	1,025,000
Mortgages	500
Unredeemed tickets	11,780	10,007
Suspense account	25,609	19,981
Contingent account	9,687
Montreal Street Railway Company's loan....	204,272	209,277
Accrued interest on bonds.....	700,581	607,314
Cumulative dividend on preferred stock.....	181,731	162,831
Total	\$3,194,560	\$3,070,810

President L. J. Forget says, in part, as follows:

In the city proper few extensions have been made, as the city has not seen fit to grant any new routes, notwithstanding that this company has persistently urged the Council to consider the question of granting new routes in order to meet the growing requirements of the public. This attitude is to be regretted, as the company has been, and is, anxious to keep well ahead of

the requirements, in order that the public may get the best possible satisfaction from its car service. The directors intend to continue to press this matter upon the Council, in the hope that they will soon realize the importance of considering and dealing with a question of such public importance.

The Montreal Park & Island Railway Company has, during the past year, shown satisfactory results.

In the past years the Montreal Park & Island Railway has been a charge on the Montreal Street Railway; but this year the company has shown improved earnings and was enabled to pay to the street railway company the sum of \$55,101, on account of interest, and the directors believe that the returns from this investment will continue to increase.

The company has entered into a franchise with the Notre Dame de Grace for the extension of its system through the municipality, extending over a period of fifty years.

The company has secured a right of way from the present terminus of the Back River route to a point outside the village of St. Vincent de Paul on the south shore of the river.

During the past year additional right of way was purchased on the Cartierville line, in order to permit the continuing of the double tracking of this division.

The Montreal Terminal Railway purchase was completed on the first of July, and the directors anticipate that this property will become a valuable asset to the shareholders in the future.

A STATEMENT REGARDING PENNSYLVANIA'S NEW YORK PLANS

Vice-President Samuel Rea of the Pennsylvania Railroad Company authorizes the following statement:

"It was originally intended by the Pennsylvania Railroad to change from steam to electric locomotives near the Hackensack portal of the New York tunnels, and the alignment of track from Harrison to this portal was made accordingly. It having been decided, however, to change locomotives at Harrison, this short section of track is being improved by reducing the curvature at a very moderate expenditure. The report that this revision of line is due to an engineering mistake, and involves a million-dollar expenditure, is incorrect and grossly exaggerated."

OHIO ELECTRIC RAILWAY ORGANIZES

The organization of the Ohio Electric Railway Company, of Cincinnati, has been completed by the election of the following officers: W. Kelsey Schoepf, president; Norman McD. Crawford, vice-president; F. A. Healy, secretary-treasurer. The directors are: W. Kelsey Schoepf, Norman McD. Crawford, F. A. Healy, D. G. Edwards, J. B. Foraker, Jr., and Dana Stevens, all of Cincinnati; J. Levering Jones, of Philadelphia, and Hugh J. McGowan, of Indianapolis.

D. G. Edwards, vice-president in charge of traffic, presented his resignation, giving as his reasons that the duties of the office were becoming too heavy when taken in connection with his other work, and that he was forced to be absent from home too much of the time. Mr. Edwards was made president of the Lima & Toledo Traction Company, the Indiana, Columbus & Eastern and the Columbus, Newark & Zanesville, all companies forming a part of the larger system. In addition he will act in an advisory capacity to the traffic department. No one has been selected to fill the vacancy, and the duties will be performed by others for the present.

As previously announced in the STREET RAILWAY JOURNAL, J. L. Adams, general manager of the Central Division; A. W. Jordan, assistant general passenger and freight agent, and George Bush, chief clerk in the office of D. G. Edwards, have also resigned. W. A. Gibbs, in charge of the Eastern Division, will also have charge of the Central Division in the future, with headquarters at Columbus. These resignations are due to the change brought about by the retirement of Mr. Edwards from the traffic department, it is said.

This company has a large amount of construction work under way, and will make one of the large Western systems. Working in conjunction with the McGowan roads of Indiana, the two systems will effectually cover the two states and will be in a position to do an extensive business. The headquarters of the Ohio Electric Railway Company will remain in Cincinnati, and the business will be directed by President Schoepf.

THE SITUATION IN NEW YORK

The quarterly dividend of 1½ per cent on the stock of the Third Avenue Railroad, guaranteed under the lease by the Metropolitan Street Railway Company, payable Oct. 31, was not met because of the order given the receivers by Judge Lacombe in the United States Circuit Court on Oct. 8. In issuing his order directing the receivers to default on the quarterly dividend, paid as rental, Judge Lacombe called attention particularly to that clause in the Third Avenue lease which prevents stockholders of the Third Avenue from repossessing their property within six months after any default. Judge Lacombe declared that by that time "sufficient information can be gathered and made public by the receivers as to give such enlightenment as to the whole situation as will enable the court to deal understandingly with all questions as to these items of rent and mortgage interest."

According to the *Wall Street Journal*, the Third Avenue situation is complicated by the fact that the property not only is leased for 999 years to the Metropolitan, but that the Metropolitan Street Railway and the New York City Railway, together, according to latest figures obtainable, control \$7,880,000, or 49.3 per cent, of Third Avenue's entire \$15,995,800 outstanding stock, while the public holds \$8,115,800, or 50.7 per cent. Furthermore, the earnings of the Third Avenue property from the time it was leased by the Metropolitan have been far from sufficient to meet the dividend paid as rental by the Metropolitan. No report of earnings of the Third Avenue alone has been published since 1904. The report for the last full year was that ended June 30, 1903, and showed a surplus after charges of only \$44,527. This meant practically nothing earned for the stock. The outstanding \$36,943,000 4 per cent bonds of the company, put out a few weeks after the road was leased to the Metropolitan, require such large interest charges as to leave little for the stock.

FURTHER TROLLEY FREIGHT DEVELOPMENT IN MASSACHUSETTS

The general movement of Massachusetts electric railway companies to secure freight and express rights was marked last week by new action by the Old Colony Street Railway Company in the Fall River case. The company now takes the whole matter to the Railroad Commissioners, over the heads of the local authorities. This is a move that would not have been possible previous to the passage of the so-called "missing link" freight law for electric railways, by this year's Legislature (Chap. 402, Acts of Mass.). But under this new law, if the local authorities refuse a grant or fail to act on it within sixty days, the company may appeal to the Railroad Commissioners, who then have it in their discretion to grant the rights through the particular community if it appears to them that the latter is standing in the way of a service that will be "of public necessity and convenience." On Nov. 3, 1905, the company tried to get these rights unsuccessfully. It put in a second petition on Jan. 1, 1906, under Chapter 441 of Mass. Acts and Resolves of 1904. On Sept. 10, 1906, the mayor and aldermen granted the desired rights, but attached a number of conditions, such as limitation of the service to five years, special rights of the city with reference to termination of franchises, etc. The Railroad Commissioners would not approve the grant with conditions which it regarded as extraneous to the contemplated service, and action was suspended.

Meanwhile, the Old Colony Company secured rights in practically all the other large cities of southeastern Massachusetts and began running cars. Last summer it secured the passage of the new law; then on Aug. 3 of this year filed a new petition with the Fall River authorities. They failed to act, and the sixty days' limitation expired this month. West of Boston, the Middlesex & Boston Street Railway (a part of the Boston Suburban system) has secured rights from the local authorities in Natick which it wants the Railroad Commission to approve. Conditions attached by the local authorities raise a question whether the Board will acquiesce without some modification. They include provision that the franchise may be revoked for violation; regulation of the service by the selectmen as approved by Railroad Commission; that the company shall receive and deliver matter at points or stations approved by the town; that the cars shall carry only matter usual to express companies in closed cars; that the freight cars shall not be

run between 11 p. m. and 5 a. m., nor on Sundays, excepting through baggage cars from connecting lines for personal baggage of passengers; and that the speed shall not be greater than that of passenger cars, as regulated from time to time.

The Berkshire Street Railway Company, operated by New Haven Railroad interests in the Pittsfield district, takes another step in electric railway development by asking approval of rights granted in Cheshire.

END OF CHICAGO TRACTION DIFFICULTIES IN SIGHT

There is every promise of a speedy settlement of the troubles of the Chicago Union Traction Company. A new reorganization plan, drawn up to take the place of the one objected to by the bondholders and which a few months ago was held by the United States Supreme Court to work an injustice to the present holders of the first mortgage bonds, has been agreed to by all concerned. The new plan differs from the old one by providing that the money for the rehabilitation shall not constitute a mortgage on the property until title has been perfected by the Chicago Railways Company. The company is required to perfect its title by Feb. 11, 1910, three years from the date of the ordinance.

According to the new plan, the money to rehabilitate the properties and pay off the floating debt so that the system can be taken out of the receivers' hands is to be raised by two syndicates. One, to be called the rehabilitation syndicate, will furnish \$12,000,000 in the purchase of first mortgage 5 per cent bonds at a price which the board of directors of the Chicago Railways Company may determine. This money is to be used for the improvement of the properties.

The other, the "organization syndicate," will float \$5,000,000 of "collateral notes" drawing interest at 6 per cent and redeemable at the option of the syndicate after three years. This money, or as much of it as needed, is to be used to pay off:

Receiver's certificates aggregating.....	\$1,072,000
Car trust obligations.....	760,000
Real estate mortgages.....	1,969,000
Legal expenses, including all costs of the receivership and charges connected with the transfer of the properties to the Chicago Railways Company.....	1,969,000

The \$12,000,000 is not intended to mark the limit of cash to be spent in improvement work. It is figured it is all that can be spent in two years and after that more money can be obtained. The amount is limited to the demands of the board of supervising engineers under the ordinance.

In addition to these first mortgage securities to raise the ready cash the Chicago Railways Company is to issue \$37,500,000 of second mortgage bonds to take up existing bonds of the companies comprising the Union Traction Company and stock of the two underlying companies.

When the new plan was first made public it was subjected to an attack by Attorney Jacob Newman, representing holders of part of the floating indebtedness, which aggregates \$4,400,000. He made the point that his clients were not sufficiently secured and contended that the earnings belonged to the creditors until their claim was satisfied, and that dividends not be paid to the stockholders first. At a subsequent conference it was agreed that instead of getting 8 per cent dividends, if earned, on their stocks, holders of the Union Traction and North and West stocks will get 4 per cent a year until one-half the floating indebtedness is paid; then the dividends are to be increased to 5 per cent until the remaining half is paid.

To take up the floating debts, amounting to about \$4,400,000, in judgments, promissory notes and receivers' certificates of indebtedness, "series C" bonds will be issued, to be retired by means of a sinking fund. Provisions for the disposition of the sinking fund were also made by the arbitrators and agreed to by the lawyers.

A new order of possession will probably be entered by Judge Grosscup granting to the Chicago Railways Company the right to operate for twenty years the lines under the newly approved plan. The company will accept the traction settlement ordinance and the receivership will be continued indefinitely by this program.

In view of the probable termination of all difficulties, the people of Chicago are looking forward to through car routes between the North and South Side and universal transfers provided for in the franchise ordinances. Twenty-one through routes are planned. However, before many of them can be adopted considerable new track will have to be constructed.

MASSACHUSETTS HALF-FARE LAW LEGAL

The case of the Interstate Consolidated Railway vs. the State of Massachusetts, involving the constitutionality of the Massachusetts statute requiring street railway companies to sell tickets to school children at half-rates, was decided by the Supreme Court of the United States in accord with the State's contentions. The opinion was handed down Nov. 4 by Justice Holmes and upheld the law. The case originated in the town of Attleboro. The decision raised the interesting point as to whether a charter for a corporation involving a contract based upon an unconstitutional law is binding, and the majority of the court in effect held that such may be the case. In announcing the court's decision, Justice Holmes said that the court had reached the conclusion that inasmuch as the law was enforced when the charter was granted it was binding regardless of the law's validity. As for himself, however, he considered the law to be in pursuance of the state police power, and was willing to sustain it on that ground. He also stated that Justice Harlan believed it necessary that the law should be constitutional.

SOUTHERN PACIFIC IMPROVEMENTS

Pending the report of its engineers on the electrification of its lines across the Sierra Mountains, referred to at length in the STREET RAILWAY JOURNAL for Aug. 31, 1907, the Southern Pacific is carrying out improvements, the effect of which on transcontinental traffic will be immediate. Twenty-four sidings between Roseville and Truckee are being lengthened, so that after this month trains of forty-five instead of thirty cars can be sent across the mountains to Ogden. Adding 700 ft. to twenty-four sidings of a railroad built upon mountain ledges was an enormously difficult and expensive undertaking. One-half the sidings are in the 46 miles of snow-sheds which enclose the road between Blue Canyon and Truckee. The extension of the snow-sheds alone required 7,000,000 ft. of lumber. At Summit an entirely new track, 3100 ft. in length, was put in to avoid the congestion which has blocked traffic at this point. In addition to the siding extension, the Southern Pacific is laying a double track between Truckee and Winsted, and between Elvas and Loomis. This work is almost completed, and with the vast terminal improvements being carried out at Roseville, will double the capacity of the Harriman lines in this territory. In the new Roseville classification yard, the natural distributing points for transcontinental coastwise and transcontinental traffic, the last of 50 miles of track is being laid. The receiving, classification and departure tracks comprise 27 miles, the remainder being storage, repairs and industry spurs. Work is also being rapidly pushed on additional round-house facilities and repair shops at Roseville.

PREPARING PUBLIC SENTIMENT FOR HIGHER FARES

There are indications that some of the street railway interests in Massachusetts are taking steps to prepare public sentiment for an increase in fares on the country lines. For two years or thereabout proceedings before the Railroad Commission have been noted from time to time, whereof the net result has been to allow the companies to get a larger return for country service through the curtailment of transfer privileges or the reduction of fare limits. The more notable instances of this kind have had to do with sections of the Boston & Northern and Old Colony street railways, the systems covering the large territories north and south of Boston, respectively.

Recently the management of the Blue Hill Street Railway has caused to be sent out for publication in local newspapers along its line, through Milton, Canton and Sharon from the Boston Elevated Railway terminus at Mattepan, items calling attention to the low return on the average country line of street railway, of which the Blue Hill is one. The first item was as follows:

"A street railway expert says: Practically every class of commodity which the public is buying to-day, outside of street railway and telephone services, and in a few isolated cases, gas and electricity, has been advanced in the past three years. The street railways either by charter or custom are held to the five-cent rate. And yet the advance in the cost of operation has affected street railways precisely as much as it has manufacturing concerns. There can be no question but that if the

present tendency toward increased cost continues, the street railway companies of the country will be obliged in time to seek relief in higher rates.

"The city traction systems which serve a densely populated area can probably manage to make a living profit on the five-cent rate; but the long country lines in sparsely settled districts have already felt the pinch and are apparently destined to feel it even more severely. The city lines get a liberal percentage of profitable short-haul business, but the riding in the suburban and country districts is for the long haul.

"It is certainly a suggestive fact that forty-six Massachusetts street railways in the 1906 fiscal year, operating nearly 750 miles of track, showed a combined surplus after fixed charges of less than \$125,000. That was in 1906, one of the best trolley years in recent street railway history. It is probable that during the year which ended September 30 last many of these forty-six roads have shown a considerable loss after charges, so that the combination of forty-six will show a deficit instead of a small surplus."

In the weekly papers of a week or two later, the same interests secured the publication of the following, dealing directly with their local situation:

"The report of the Blue Hill Street Railway Company for the fiscal year ending September 30, 1907, shows that the company operated at an absolute loss of \$7,040.32. Ever since the company started business it has lost money, this loss aggregating \$55,622.07. To carry on its operation the company has been compelled to borrow extensively, and at the present time has out notes for \$185,000. All this means that the company is carrying its patrons at less than the actual cost, and the stockholders are steadily losing money. What the outcome will be is very difficult to foresee, but it is hoped that a satisfactory solution may be reached without curtailing the present service. The road has been of great convenience and benefit to the citizens of Canton and Stoughton, and any financial disaster to it would be very unfortunate for those towns."

That there is any intention of abandoning any part of the service over the Blue Hill trackage seems unlikely, inasmuch as this is a Stone & Webster property, and was some time ago named in a public hearing as one of the several local lines in the territory between Boston and Providence, which the firm plans to connect with the proposed Boston & Providence Interurban Electric Railroad, for which the certificate of public exigency is shortly expected to issue from the office of the Railroad Commission—the first to be approved under the "interurban law" passed in 1906.

INTERURBAN ROADS INCLUDED

The Indiana Supreme Court has decided that the word "railroad" used in the law relating to subsidies includes interurban roads, and that the act of 1903 declaring that a large body of legislation concerning railroads "shall be extended to and held to include every kind of street railroad or interurban street railroad by whatever power its vehicles are to be or are transported," is constitutional. Accordingly, the court held that the grant of a \$25,000 subsidy voted by the taxpayers of Wayne Township, Kosciusko County, to the Winona Interurban Railway Company, was valid, and that the Circuit Court judge properly refused to enjoin the county officials from placing the tax on the duplicate for collection.

It was insisted that the act did not have a constitutional enacting clause, and that it was an amendatory act which failed to recite the acts amended. The court held that the enacting clause is there, and that this act was supplementary only by the way of giving an interpretation to the word "railroad," and, therefore, not governed by the rules which apply when the Legislature undertakes to amend a statute. Judge Hadly, who wrote the opinion, called attention to the fact that the term "railroad" never did have any connection with the use of steam power, as the first railroad law particularly mentioned railroads operated "by steam, animal or any mechanical power."

This decision has been patiently waited for by promoters of interurban lines in Indiana. The question was raised that the law relating to the voting of a subsidy tax in aid of a railroad did include an electric road. For this reason some townships refused to vote a subsidy and other petitions were held up by county commissioners pending the decision of the Supreme Court. It is said that a number of projected roads will now be built, because the people want them and will vote the necessary subsidy assistance.

CONSOLIDATED COMPANY ANNOUNCES OPERATING CHANGES

Following close upon the announcement of the substitution of a system of through trolley tickets in place of the old system of repeated payments on all trolley lines controlled by the Consolidated Railway Company in Connecticut and Rhode Island, the statement is now made by officials of the company that early steps are to be taken for the adoption of a standard trolley signboard of the most improved type, indicating the destination of cars. The new style of sign it is stated will be transparent both by night and by day, its purpose being to do away with any confusion which may have arisen in the past, and to make clear to passengers the destination of all cars. The new sign will be placed on both ends and both sides of cars. Experiments looking forward to the selection of the most satisfactory model of sign have been in progress for some time, and the style selected will, it is stated, be made standard throughout. It is believed by officials that it will result in much greater convenience and the doing away with any complaints about poorly lighted or illegible car signs.

MAYOR JOHNSON RE-ELECTED—CLEVELAND COMPANY WITHDRAWS LOW-FARE TICKETS

Mayor Tom L. Johnson was, on Nov. 6, re-elected for the fourth time as Mayor of Cleveland in a hard-fought battle in which the Republican ticket was headed by Congressman Theodore E. Burton, chairman of the House Committee on Rivers and Harbors. The official count on 130 of 244 precincts gives Johnson 23,990; Burton, 20,434. The present ratio if maintained would give Johnson a majority of over 8000.

Readers of the STREET RAILWAY JOURNAL are familiar with the campaign in Cleveland through the accounts that have appeared in this paper from week to week dealing with the street railway situation and the attitude assumed by the candidates on the street railway franchise question, the main issue of the campaign. The closing week of the campaign developed into a series of accusations and denials. It was clearly shown, however, that the franchises given the new companies have proved to be of such a character that they are not bound to give the people a three-cent fare. Neither are they tied down to universal transfers, or any transfers, unless the company's income will produce 6 per cent. on the capital stock of the companies.

By most people the re-election of Mayor Johnson is taken to mean that there will be a continuation of the street railway fight, and that it will be harder than ever before. The Cleveland Electric withdrew its seven-for-a-quarter tickets as soon as it was known that Mr. Johnson was elected and took down the advertising in the cars appealing to the people to favor its offer. The opinion prevails that the new companies can do nothing with the West Side, even if they secure the right to build lines; in fact, it would seem that no company could get money now to build roads.

Along the line of advancing Mayor Johnson's interests just before the election, the City Council, acting under his advice, passed five of the seven ordinances that were presented recently, giving the low-fare companies the right to use the tracks of the Cleveland Electric in so-called free territory. They become operative within ten days after their passage, and give the Forest City Railway Company the right to operate around the Public Square and on Ontario Street, which passes through the square. From this point its cars may run over the Superior, Euclid and Prospect Street lines of the old company to East Ninth Street and on the latter for a sufficient distance to connect these streets, so that it will have facilities for handling its cars in the central part of the city. The Euclid grant extends to East Fourteenth Street, where the "graveyard" line reaches Euclid. On the West Side the Forest City is given the right to operate on Lorain Avenue from West Twenty-Fifth Street to West Seventy-Third Street; also over the Abbey Avenue bridge to West Fourteenth Street, to Kenilworth Avenue, across the Central viaduct to Central Avenue and then to Eagle Avenue, where connection is again made with the lines about the Erie Street cemetery. These grants were made on

the full Democratic vote in the Council, all the Republicans voting in opposition to them.

Last week the Cleveland Electric Railway refused to allow Peter Witt, city clerk and owner of one share of the capital stock of the company, to continue his investigation of the books, although his experts had been engaged in this line for several weeks past. President Andrews said that the investigation was being made for political purposes and that the material secured thus was being handed over to certain newspapers for use against the company. For this reason he thought that Witt was not exercising the right of a stockholder, but was merely securing ammunition, as far as possible, to aid Mayor Johnson in his campaign.

Witt appealed to Judge Chapman to enforce an order of court allowing him to continue the investigation, but the court refused. The matter was then taken to the circuit court and Judge Marvin, sitting alone, said that the case would have to go over to Nov. 8, and that he would hold matters where they are until a full court could hear the case. This was disappointing in the last days of the campaign, as Witt had been very busy not only with this, but in taking evidence in an attempt to show that the Cleveland Electric had been using money for purposes for which it should not have been spent—that is, in advertising, printing a paper of its own, paying for the consents on certain streets and other things along the same lines.

RAILROAD ACCIDENTS IN INDIANA—BULLETINS TO BE ISSUED BY RAILROAD COMMISSIONERS

The Indiana State Railroad Commission is giving especial attention to the prevention of accidents on steam and electric railroads. According to the first quarterly bulletin issued by the commission, during July, August and September 99 people were killed and 365 injured on steam railroads and 8 killed and 34 injured on electric roads in Indiana. The commissioners say, "unquestionably a large proportion of these accidents were preventable, and there are many reasons why they should be prevented." However, in many instances the railroads are not at fault, as the bulletin shows that thirty-six of the killed—or one-third of the total—were trespassers on the railroad tracks, or trains, and so were twenty-two of the injured. The property loss amounted to \$42,863.76.

In line with its intention to investigate all serious accidents, the commission will in the future issue quarterly bulletins discussing serious railroad accidents. The bulletins will be compiled from the reports sent in by the roads in Indiana supplemented by reports from the inspectors sent out by the commission, and these reports will be used in connection with the investigation of accidents. The purpose is to ascertain what steps should be taken to prevent a repetition of accidents within the state.

In the first bulletin the commissioners say it is apparently impossible to prevent people from using railroad tracks for foot paths, and of course they do so at their peril. It is a form of recklessness to which Americans are prone, but it is inexcusable recklessness in a person defective in sight or hearing, or those otherwise handicapped in ability to get out of the way of approaching trains. The bulletin states that recklessness and carelessness are found among railroad or train men, also. Over one-fourth of the number killed, lost their lives in collisions, and seldom do collisions occur without fault of some railroad employee. The commission very sensibly calls attention to some common forms of these faults such as neglect of the proper signals for highway crossings, careless reading of train orders, and permitting loungers to loaf in telegraph offices and signal stations. It notes also that 114 brakemen were killed and 23 injured while coupling cars—a hazard which is expected to be removed by automatic couplers. These casualties were in part due to carelessness of the men and in part to defect in safety appliances. The commission's inspectors found seven interurban and eighty-seven steam line cars defective in respect to safety appliances and other defects. Only six casualties were reported from defective tools and appliances.

All of this information will be used in the investigation of accidents which will be taken up in a short time. All train men implicated will be summoned and an attempt will be made to find out who was responsible in each case, and what was the cause of the accident.

AMERICAN MUSEUM OF SAFETY DEVICES

Word has just been received that the International Jury in the section of Social Economy at the International Book, Paper and Publicity Exposition, which closed in Paris last month, made an award of the grand prix to the American Museum of Safety Devices and Industrial Hygiene. A diploma of honor, the second highest award, was made to Charles Kirchoff and T. C. Martin, respectively chairman and vice-chairman of the museum's advisory council, also to Dr. L. L. Seaman and Rudolph Lens for their active interest in promoting the work of the museum.

The museum is now occupying the entire fifth floor at 231 to 241 West Thirty-Ninth Street, New York City, and all inquiries for space, exhibits and other information should be sent to Dr. W. H. Tolman, director of the museum.

INSTITUTE LIBRARY TO BE OPEN EVENINGS

Announcement is made by the committee having supervision of the library of the American Institute of Electrical Engineers, the library of the American Society of Mechanical Engineers, and the library of the American Institute of Mining Engineers, that the library rooms will be open evenings until 9 o'clock on all week days beginning in the near future, on a date to be announced shortly. The date when this plan will go into effect will probably be about December 1st, or a little earlier. As most of our readers know, these libraries are located on the 13th floor of the new Engineering Societies Building, New York.

REORGANIZED EXTENSION COURSES IN MECHANICAL ENGINEERING AT BROOKLYN POLYTECHNIC

The Polytechnic Institute of Brooklyn starting this year with the reorganized department of Mechanical Engineering in charge of Prof. William D. Ennis, is offering enlarged courses of extension work through its evening classes. These classes began with purely lecture courses about three years ago, and have developed into valuable adjuncts to the regular college work. They offer to the student employed during the day opportunities for study or review of elementary and advanced mathematics, besides practical courses on engineering subjects.

During the past summer the mechanical laboratories of the institute have been greatly enlarged and large expenditures made for new equipment, which now includes two steam engines with high-pressure boiler, one gas engine, one gasoline engine, one 100,000-lb. testing machine, one small testing machine, pumps, meters, etc., besides the usual small equipment for field and laboratory testing. Laboratory courses are offered to evening students, involving the use of portions of this apparatus, and the training of the student in the precise measurements of engineering. A thorough course in machine design is also to be given under the direction of Prof. F. DeR. Furman; this will be open to men who have completed the equivalent of one year's work in mechanical drawing, and is intended to fit such men for positions as detail draftsmen. This course, in common with others offered, will be practical in its nature rather than mathematical. It is given on Fridays at 7:30 p. m.

The courses in heating and ventilating, by Prof. Taggart, given on the same day and hour, are planned to train men in the practical design of the commercial forms of direct and indirect heating systems.

On Wednesdays at 7:30 p. m. there is to be given a thorough course in mill engineering by Prof. Ennis. This will cover the problems met with in the arrangement of buildings, tracks and yards for large industrial works and especial discussion of the various elements entering into their engineering equipment. Attention is to be given particularly to the practical design of such features as crane installations, automatic sprinkler equipment, apparatus for generating and utilizing compressed air and hydraulic operative machines. The general principles covering the economical design of mill buildings will be discussed and exemplified, and the broad relations of engineering equipment to factory organization will be analyzed.

The major course of the series will be that on power-plant design, given by Prof. Ennis, on Thursday evenings. This will start with a consideration of the power house as a manufacturing plant, its location with regard to the raw material and the market, the choice of site and standard types of buildings. The various items of equipment will then be discussed, their performance analyzed and their relations to the general pro-

blems of design investigated. The object of the course is to fit engineers for actual practice in the design and construction of steam or gas power generating plants. The mathematical knowledge required for admission is elementary only, the subject being one that permits of thorough treatment without an extended use of higher algebra or calculus.

The evening work at the Polytechnic Institute is largely pursued by men who are candidates for a degree. A certain amount of credit is allowed, based upon the courses taken during the evening, and the student has the encouragement of working toward the same definite end as the usual day students.

SOME RECENT INSTALLATIONS OF GAS ENGINES

The saving in fuel effected by use of the gas engine as a prime mover has long been fully realized by power users of this country, yet little progress has been made except in the natural gas district, chiefly, perhaps, because of a doubt as to the reliability of engines of this type. The performance of the engines already installed by one of the prominent gas engine manufacturers, the Allis-Chalmers Company, will prove of interest.

The first gas engine of these manufacturers to be put in constant service was a tandem engine of 1000 hp maximum capacity direct connected to a d.c. generator made by the same company and of 500-kw rated capacity. This unit is installed at the Milwaukee works of the Illinois Steel Company. Although it was the first gas engine built by this company, it started successfully and has been in continuous day and night operation ever since, only shutting down with the mill on Sunday. As would be expected of an engine installed at a rolling mill, the load varies greatly in character and is subject to wide fluctuations. Another unit of 600 hp, direct connected to a 350-kw Allis-Chalmers d.c. generator, has been for some time in service at the works of the Trenton Iron Company, Trenton, N. J. This engine is supplied with gas from producers furnished by the R. D. Wood Company, and has also been in continuous service ever since it was started, on loads ranging from full-rated capacity to 50 per cent overload. A 2000-hp Allis-Chalmers engine direct connected to a 1000-kw generator has been for some time in operation on blast-furnace gas at the plant of the National Tube Company at McKeesport, Pa. This engine is the first of several units which the manufacturers are installing at the same plant. Two units, duplicates of the unit at McKeesport are just going into service at the power house of the Milwaukee Northern Railway Company at Port Washington, Wis. This is an interurban line, with the City of Milwaukee as its southern terminal, operated exclusively by gas power. The generators are 1000-kw Allis-Chalmers, 3-phase, 25-cycle alternators, and the gas is supplied by producers.

A duplicate of the Trenton engine, using natural gas, has also been recently put in service at the Kokomo plant of the Pittsburg Plate Glass Company. This is the first of a number of units which Allis-Chalmers Company is building for that service. Two units of 4000 hp each, direct connected to 2000-kw alternators will very shortly be put in operation at the South Works of the Illinois Steel Company, South Chicago, Ill. These engines operate with blast-furnace gas, and the design, in all respects, duplicates that of the engines already in service. Another 4000-hp unit is now in the course of erection at one of the Carnegie plants in the Pittsburg district, this unit being the first of seven 4000-hp units, which are being installed at the rate of one every thirty days in the same power house.

The new mills of the Indiana Steel Company at Gary are also to be equipped by gas engines and the Allis-Chalmers Company is now under contract to supply seventeen Allis-Chalmers gas engines of 4000 hp each. Fifteen of these are direct connected to 25-cycle, 3-phase alternators, which will operate in parallel and supply current to more distant portions of the mill; two to direct-current generators supplying current for portions of the plant immediately adjacent to the power house. The company is also building eight blowing engines with the same sized gas cylinders as the electrical units for the same plant, making twenty-five engines, or a total of 100,000 hp, which the manufacturers are supplying for this power house alone. It will require approximately 1000 carloads to complete the shipment of these engines. The electrical power house, in which will be installed the seventeen electrical units, is 1000 ft. long and 105 ft. wide.

NEW PUBLICATIONS

ELECTRIC RAILWAYS, by James R. Cravath and Harris C. Trow, Chicago. American School of Correspondence, Chicago. 153 pages. Illust. Price \$1.

POWER STATIONS AND TRANSMISSION, by George C. Shaad, Chicago. American School of Correspondence, Chicago. 155 pages. Illust. Price \$1.

These books form a part of the series of manuals descriptive of approved practice in the subjects of which they treat, issued by the American School of Correspondence, and supply the demand for a short, comprehensive and clearly expressed description of the main engineering principles of the topics treated. In the book on electric railways the title page indicates that the first section was written by Mr. Cravath and the second by Mr. Trow. The book is up to date and well illustrated. Professor Shaad's book is in two sections, one devoted to power stations and the other to power transmission. The latter contains a careful discussion of the method of calculating transmission losses.

ELECTRIC RAILWAYS, VOL. II, ENGINEERING PRELIMINARIES AND DIRECT-CURRENT SUB-STATIONS. By Sidney W. Ashe, New York: D. Van Nostrand & Company, 1907. 282 pages. Illustrated. Price, \$2.50.

The previous volume of this series, written by Messrs. Ashe and Keiley, related to rolling stock, and the thorough treatment accorded this subject has been duplicated in the book just issued. In the first chapter the author discusses quite briefly statistics of rides per capita and other commercial considerations relating to traffic. He then takes up the question of motor capacity and its application to schedules and load diagrams. These sections are followed by discussions of power-station location, substation design and operation, the converter, the transformer, insulating oils and auxiliary power-station apparatus.

MASSACHUSETTS ELECTRIC EARNINGS FOR SEPTEMBER AND THE YEAR

The Massachusetts Electric Company's statement for the quarter ended Sept. 30, 1907, compares as follows:

	1907	1906
Gross receipts	\$2,595,586	\$1,573,001
Operating expenses	1,314,437	1,391,312
Net earnings	\$1,281,149	\$1,181,689
Charges and taxes.....	406,680	376,643
Surplus	\$874,469	\$805,046

As the fiscal year ends Sept. 30, the following forecast of the annual report has been made:

	1907	1906
Gross receipts	\$7,761,062	\$7,520,537
Operating expenses	5,003,204	4,847,046
Net earnings	\$2,757,858	\$2,673,491
Fixed charges	1,702,622	1,594,502
Balance	\$1,055,236	\$1,078,989
Reserve for winter expenses.....		38,802
Surplus	\$1,055,236	\$1,040,187

TWIN CITY RAPID TRANSIT EARNINGS FOR QUARTER AND NINE MONTHS

Twin City's report for September and nine months compares as follows:

	1907	1906
Gross receipts	\$561,446	\$534,151
Operating expenses	251,276	236,926
Net earnings	\$310,170	\$297,225
Charges, taxes and preferred dividend.....	115,142	114,758
Surplus	\$195,028	\$182,467
Nine months' gross receipts.....	4,540,272	4,217,437
Operating expenses	2,180,436	1,951,950
Net earnings	\$2,359,836	\$2,266,387
Charges, taxes and preferred dividend.....	1,036,741	1,004,152
Surplus	\$1,323,095	\$1,262,235

RESUMING THE TRANSIT INQUIRY IN NEW YORK

The general investigation by the Public Service Commission of traction affairs in New York will not be taken up again until Monday of next week, or possibly Tuesday. According to the present plans, the broad subject of vehicular traffic in Manhattan, with its relations to congestion on the surface lines, will furnish the material for the investigators. Herbert D. Mason was busy Wednesday examining patrolmen from the police traffic squad to get their ideas on this subject. Mr. Mason gathered from them that the chief reason the truckmen stuck to Broadway and other congested north-and-south streets was that in winter side streets were not cleaned so they could get through them. Broadway would be free from snow, while cross streets and some of the less important north-and-south streets would not be. Therefore, a truckman would stay on Broadway all the way uptown rather than take any chance about getting back to it after he had left it once. That habit, acquired in winter, accounted largely for the truck traffic on these congested streets in summer. These facts and others will be brought out at the hearings, the views of the railroad men and merchants and business men obtained, and the commission will endeavor to formulate the result into some sort of a recommendation to the Board of Aldermen, perhaps, for legislation on the subject.

A hearing was held before Commissioner Bassett on an order to the Brooklyn Rapid Transit Company to show cause why a superintendent of terminals should not be employed to have supervision over all the bridge traffic.

ST. LOUIS COMPANY OPENS CLUB HOUSE

The United Railways Company, of St. Louis, has opened its new club house. The club house is the old Fowler mansion remodeled and is located at Grand and Park Avenues, and is for the use of the 2800 employes of the company. The grounds extend from Park to Vista Avenues on Grand, and will be fitted up for baseball, football and other outdoor sports. The interior of the house has been made into a handsome theater, equipped with a good stage, asbestos curtain, scenery and all the needed equipment for producing plays. In the house a fine gymnasium has been constructed and also reception rooms and other conveniences.

General Manager Robert McCulloch, of the company, has announced the company's willingness to place on sale \$30,000 worth of street car tickets in payment for which will be accepted personal or corporation checks. The tickets are good for one fare and are issued in strips of five. Capt. McCulloch has suggested that business houses may find it advantageous partly to pay the salaries of employes in street car tickets during the money stringency.

PERSONAL MENTION

MR. E. V. POPE has resigned as general manager of the Alabama City, Gadsden & Attalla Railway Company, of Gadsden, Ala.

MR. JOHN F. REARDON has been appointed successor to Mr. H. C. Barrow as superintendent of the Lehigh Valley Transit Company, of Allentown, Pa.

MR. R. R. RAY, formerly superintendent and claim agent of the Southern Michigan Railway, has accepted the position of claim agent of the South Chicago City Railway.

MR. JAMES WOODS, the retiring superintendent of the Springfield Traction Company, of Springfield, Mo., has been presented with a gold watch by the employees of the company as a token of esteem. Mr. Woods will engage in the coal business at Champaign.

MR. WILLIAM S. GORSUCH, of the electrical engineering department of the New York Central and Hudson River Railroad Company, has been selected by the authorities of the Y. M. C. A., of New York, to conduct its evening course in electricity. This course extends over two years, the first is devoted to the principles of electrical engineering and the second to their practical application.

MR. FLETCHER M. DURBIN has resigned as assistant superintendent of the Indianapolis Traction & Terminal Company, of Indianapolis, Ind., to accept of the position of general manager of the Evansville City Railway and the Evansville & Southern Indiana Interurban Company. Mr. Durbin succeeds Mr. R. R. Smith, who, as previously announced in the STREET RAILWAY JOURNAL, has become connected with the Louisville Railway Company.

MR. THOMAS E. MITTEN, president of the Chicago City Railway Company, has been elected vice-president of the International Railway Company, of Buffalo. Mr. Mitten succeeds Mr. Arthur N. Robinson, a New York capitalist, who has large holdings and represents others. The position is an inactive one and was formerly held by Mr. Daniel S. Lamont. Mr. Mitten was formerly general manager of the International Company. At the time the Buffalo system changed control, Mr. Mitten went to Chicago.

MR. JOHN L. MATSON, formerly general manager of the Muncie & Portland Traction Company, Portland, Ind., has assumed the duties of resident manager of the South Chicago City Railway and the Hammond, Whiting & East Chicago Electric Railway. Previous to his connection with the Muncie & Portland system Mr. Matson held the position of superintendent of motive power and machinery of the Chicago & Milwaukee Electric Railway, and previous to that the position of superintendent of motive power of the Indiana Union Traction Company.

MR. F. W. COEN, for some years secretary and treasurer of the Lake Shore Electric Railway Company, has been chosen general manager, to succeed the late Mr. F. J. Stout. Mr. Coen has proved himself an electric railway man of ability and is well fitted for the new position, which he is to assume at once. He will retain the office of treasurer of the company. Mr. John Witt has been chosen as secretary and assistant treasurer. Mr. Coen will make his headquarters at Norwalk, where the office of the general manager has been located for some time.

MR. EDWARD E. POTTER, superintendent of the Union Street Railway Company and the Dartmouth & Westport Street Railway Company, who, as announced in the STREET RAILWAY JOURNAL of Oct. 19, had been granted leave of absence from the companies to travel in the West, has accepted the position of assistant manager of the Seattle Electric & Power Company, a Stone & Webster property. Before leaving for the West, Mr. Potter was tendered a dinner at the Hotel Algonquin by fellow-members of the New England Street Railway Association and the Massachusetts Street Railway Association. Among those present were Mr. C. H. Page, manager of the Springfield Street Railway, who acted as toastmaster; Mr. Robert S. Goff, general manager of the Old Colony and Boston & Northern Street Railways; Mr. C. S. Sargeant, vice-president, Boston Elevated Railway; Mr. D. Dana Bartlett, auditor Old Colony and Boston & Northern Street Railways; Mr. Frederick S. Swift, of Boston; Mr. M. C. Brush, vice-president and general manager, Newton Street Railway; Mr. H. H. Crapo, president of the Union Street Railway Company, New Bedford, and Mr. Charles C. Peirce, of the General Electric Company.

MR. EDWARD M. WHARFF has been appointed electrical engineer of the Syracuse, Lake Shore & Northern Railroad, of Syracuse, N. Y., in charge of the power station, car house and cars, and overhead work. Mr. Wharff graduated from Syracuse University, being a member of College of Liberal Arts class of 1903, and subsequently graduated from Q. C. Smith College of Applied Science, class of 1906. Since graduation he has been connected with the Rochester, Syracuse & Eastern Railroad. Mr. Wharff says the Syracuse, Lake Shore & Northern Railroad is to make marked changes in both power supply and cars. Within a short time it will begin to use Niagara Falls power, purchased from the Niagara, Lockport & Ontario Power Company, and later will place in use new high-speed interurban cars equipped for operation by both direct current and single-phase alternating current.

MR. EDWIN J. WILCOXEN, general superintendent of the Rochester Railway Company, of Rochester, N. Y., died in Rochester Monday, Nov. 4, following an operation for appendicitis. Mr. Wilcoxen was a young man, only thirty-six years of age, and had been connected with the Rochester Railway Company and its subsidiaries since 1900. He was born at Seneca Falls, N. Y., April 27, 1871, and after attending the public

schools in Seneca Falls, entered Mynderse Academy. He then pursued a special business course. In 1888 he entered the employ of the Buffalo, Rochester & Pittsburg Railway Company, acting as mileage clerk. One year later he advanced to the car service department, with headquarters at Bradford, Pa., and subsequently became connected with the general superintendent's office at Bradford. In 1891 he became record clerk of the Wagner Palace Car Company at the Buffalo works, and the next year he was made secretary to the assistant manager of the Wagner Company. In 1894 Mr. Wilcoxen was appointed to the important position of assistant superintendent of the New York State Reservation at Niagara Falls. He filled this position for two years, and was then appointed general passenger agent of the Waterloo, Seneca Falls & Cayuga Lake Railway Company. In May, 1900, he was appointed assistant superintendent of the Rochester & Sodus Bay Railway Company.

MR. C. L. DE MURALT, the well-known consulting engineer, has recently returned from a flying trip to Europe, where he made an examination of the Arlberg Tunnel under the Tyrolean Alps, which is shortly to be electrically equipped. Mr. Muralt has been appointed consulting engineer to the State Railways of Austria and the work to be done under his supervision is said to be the longest stretch of steam railroad electrically equipped in either Europe or in the United States, there being about 140 miles, exclusive of the tunnel. The tunnel is on the main line from Paris to Vienna, and is 7 miles long, with steep grades from each mouth to the middle. When the plans developed by Mr. Muralt are carried out the speeds of trains passing over this line will have been increased 25 per cent and the capacity of the road 50 per cent. To accomplish this result three-phase locomotives will be used, capable of developing 3000 hp, or about three times as much as the New Haven locomotives use in the New York suburban service. The electric locomotives designed for the Arlberg Tunnel will be particularly adapted to this service, as when coasting down the grade out of the tunnel they will generate and return to the system about 60 per cent of the energy used to pull the train up the grade into the tunnel. Mr. Muralt, who has recently been appointed Professor of Electrical Engineering at the University of Michigan, has been granted a leave of absence from the university in order that he may supervise this work.

MR. JEFFERSON POLK, president of the Des Moines Street Railway Company, died at his home in Des Moines, Nov. 2, after a two weeks' illness. Mr. Polk was born in 1830 near Georgetown, Ky., and was graduated from Georgetown College. Deciding to fit himself for the practice of law he entered the law office of Mr. P. L. Cable, of Georgetown, subsequently for many years prominently identified with the Chicago & Rock Island Railroad. In 1855 he went to Des Moines and opened an office with Judge Casady. In 1857 he was admitted to the bar of Polk County, and in 1859 formed a partnership with Judge Casady and M. M. Crocker, afterwards General Crocker. In 1864, Mr. Crocker having gone into the army and Mr. Casady having retired, Mr. Polk formed a partnership with F. M. Hubbell, which continued for twenty-three years. In 1866 they financed the first street railway, which had been chartered by Dr. M. P. Turner, and in 1868 they sold their interest to the doctor. In 1871 Mr. Polk organized the Des Moines waterworks with a capital of \$200,000, which soon after passed to Polk & Hubbell, and in 1880 to a joint stock company. In 1874 he gathered together the odds and ends of a project to build a railroad to Minnesota, changed the name of the company and built a narrow-gauge road to Ames. After completing the road he sold it to the Des Moines & Minnesota Railway Company. It is now the Northwestern. In 1881 he built a narrow-gauge road to Waukee and formed a syndicate which extended the road to Panora and Fonda, with a branch from Clive to Boone, and also built the road from Des Moines to Albia, now a branch of the Wabash; also the Des Moines Union Railway. In 1888 there had been chartered two or three street railway companies, and in 1889 Mr. Polk purchased the franchises of all the other companies in the city, consolidated the lines, electrified them, and laid the foundation for the present local Des Moines system. Having perfected the street railway system, Mr. Polk began to work out ideas for interurban roads, and with his son-in-law, Mr. George B. Hippee, and son, Mr. Harry Polk, organized the Inter-Urban Railway Company, which has built a road to Colfax, one to Woodward and Perry, and has projects in several other directions.