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BACK COPIES.—No copies of issues prior to September, 1904, are kept on sale, except in bound volumes.

DATE ON WRAPPER shows the month at the end of which the subscription expires. The sending of remittances for renewal prior to that date will be much appreciated by the publishers.

CHANGE IN ADDRESS

Commencing with this issue the address of the main office of the Street Railway Journal is

239 West Thirty-Ninth Street, New York City

Of this issue of the Street Railway Journal 8300 copies are printed. Total circulation for 1907 to date 295,850 copies, an average of 8218 copies per week.

Traffic Circulars

A few years ago railway literature issued for the promotion of traffic was confined to timetables, which were of the most matter of fact kind. No pretense was made at artistic effect, and nothing was printed but the running or leaving times of the trains. Steam railroads have made a great advance since that time, but the most attractive circulars issued at present to attract travel are those published by the electric roads. Whether this is due to the fact that the electric railway managers are less bound down by rules of conservatism we are unable to say. But while the electric railway circulars may not sometimes rival in size those issued by the large steam railroads, they nearly always show an effort to put the information contained in them in an attractive way. It is rare now to find an electric road depending largely on pleasure traffic which does not publish some kind of a circular, with usually a map, to attract the business of the traveler or pleasure seeker. Sometimes these circulars are issued annually, sometimes monthly, and occasionally at weekly or shorter intervals. Many are historical treatises of the territory traversed; others are less pretentious, but all appeal to some need of the traveling public. As a promoter of traffic the illustrated circular now holds a recognized position.

Standardizing Fuses in the Power Plant

The increasing use of auxiliary power circuits in the generating plant has led to the installation of special switchboard panels for the control of auxiliary motors and lights in a number of recently-built stations. The grouping together of these services at a central point is a great convenience from the standpoint of operating ease, and the practice tends to reduce waste of current with the further gain of lower first cost of the auxiliary wiring control than is likely to be the case where lighting and motor circuits are provided with switches, fuses and other fittings scattered all over the plant. Of course, a certain amount of switch and fuse subdivision is sure to be necessary in a large plant, but in almost every instance the use of a central controlling panel is also desirable.

In a large plant the number of fuses needed in auxiliary service is surprising. Coal-handling equipment when motor driven, pump motors, small shop motors, ventilating circuits, oil-switch motors, possibly valve and crane motors and all the important lighting branches require fuses of a certain capacity which varies with the current demands of each case. In a recent plant no less than eighty auxiliary motors were counted, and every one of these circuits, or at least every group of circuits of any operating importance, had to be separately fused. The subdivision of lighting circuits in the boiler and turbine rooms, on the switchboard galleries, in the high-tension switch house, coal pocket, machine shop and laboratory, still further complicated the fuse question. In such cases the importance of standardizing the fuses as far as possible is well worth considering, and in the plant in question a well directed scheme of using but one make or two at the outside, with as few separate fuse sizes as possible, was being carried into effect.

The advantages of having a single make and few sizes

standard in a plant are obvious after a little thought. A large number of different fuse sizes and of varying makes complicates the store room problem, and takes up valuable space. Too great an assortment ties up money which ought to be released for other uses; but the chief gain in using a few sizes is the greater speed with which auxiliary shutdowns can be repaired, and the reduced danger of getting the wrong style or size of fuse into the circuits in trouble in times of emergency. The fewer the number of fuses to select from, the more quickly can the auxiliary circuits be placed again in service, and the reduction in store room annoyances is, as mentioned above, a boon. The number of spare parts which have to be kept in stock in a large station is well worth reducing, whenever it can be done without danger of going to the extreme of having too few supplementary pieces of apparatus on hand to insure practically continuous service.

Handling Traffic While Double Tracking

The difficulties of maintaining regular and punctual service under the hindrances of construction work are appreciated by all operating men who have had experience with extensions or alterations of their track systems. To carry out a given piece of construction on an electric road is a straight enough problem if labor and supplies are not scarce, but to keep the service in good shape under these conditions is a very different matter, considering the frequency of car movement on street and interurban railways.

In city service, when double tracking is to be done, it is often possible to do a large part of the work at night. Travel can also be deflected to its destination by alternative routes in many instances. A certain amount of inconvenience cannot well be avoided in double tracking a line in a city street, but if passengers are advised of route changes, and if the flag signaling arrangements are good at points where both forward and reverse movements of cars are necessary, the service ought not to be seriously impaired. Definite fixing of responsibility at passing points is essential, and there is no doubt that if a temporary telephone line were installed more frequently at the place where the work is being done, the chances of delay and accident would be much reduced. On account of the slow speeds usually necessary in passing through city track construction work, the dangers of accident are probably much less than in interurban service, and the chief problem is the avoidance of blockades.

The double tracking of an interurban line necessitates the most careful handling of the car movements, especially when part of the new track is utilized during construction by the regular service. It may be necessary to station starters or extra dispatchers at the work itself, and extra telephone facilities are almost imperative. If it is possible to map out a set of special instructions to train service employees in advance of the beginning of construction, so much the better. Usually, however, the variations from the normal in car movements have to be handled on a day by day basis, as on one day the construction may require the use of part of the old track and part of the new; on another, temporary cross-overs may be shifted in position, and on a third, the old track alone may be passable. The result is that either the regular dispatchers have a large amount of extra work on their hands, or extra men are located in the construction territory, with power to control car movements in the abnormal zone. At such times a niggardly policy with regard to the location of telephones is almost certain to interfere with the giving of good service. In cases where it is possible to complete the second track from one or both ends, working toward the middle, the flexibility of operation can be increased, particularly if temporary cross-overs can be installed as needed If the double tracking of the line involves shifting the position of the first track, the quality of the service can be kept high by providing for partial movement on sections of the second track as fast as it is completed. It is a mistake to think that the second track must be completely built for severe service at fast speeds before it can be utilized effectively in by-passing part of the construction work. Often a slow run of a few hundred feet on a temporary track, or on a section of the second pair of rails where high speed is out of the question enables a car to cross back to a high-speed track and continue its trip without much loss of time. A little planning of special movements in advance of the beginning of construction is certain to be profitable.

Superheating Steam

In all developments of old-established arts there is frequently apt to be great divergence of opinion as to the way in which details should be arranged. Thus in regard to the question of superheat, there are many different ideas as to how superheaters should be designed, and how they should be controlled. Those ideas range from the use of elaborate and efficient, but costly apparatus, to that which is simple and individually inefficient but is cheap to install and operate, or both. Every gradation may be met between these extremes.

In the most elaborate class of such apparatus each individual superheater is equipped with its own automatic controlling device, which serves to cut off steam from that individual apparatus that is practically constant in temperature. Ten such superheaters worked in parallel will give results very little better than the simple superheater. Such an efficient apparatus is, of course, costly, but it is very reliable. At the other end of the scale is the small tube superheater, made of the cheapest tubes, entirely devoid of any control of temperature. Its output of superheated steam one minute may be coming away at 50 degs. of superheat; next moment it may be coming away at 200 degs. or 250 degs. Obviously such an apparatus is not well fitted to work alone. But let us suppose that a dozen such superheaters are turning out the steam from as many boilers and that each one of the dozen superheaters is giving an output as variable as just stated. The object of the engineer is to supply two engines with steam superheated, say to 140 degs. F. His engines are taking steam from a dozen different superheaters, but the output of these is all mingled in one steam main, and the supply of steam which reaches the engines is practically of fairly uniform temperature, because with a dozen apparatus no two of them at one time are in maximum or minimum phase together, for they are all fired at a different time and the many variations combine with a fairly level average of temperature. The Germans, who know perfectly well that the crude, small tube

superheater, entirely unfrilled with control devices, will burn out in a few months, continue to employ such apparatus because the gain is greater than the expense of replacing the burned-out tubes. We know no American or English makers of small tube apparatus, however, who take the German view. They do not employ cheap tubes, but seek for the best tubes that can be got, solid, weldless steel of high quality, and probably they secure better commercial results than if they used tubes of the cheaper classes.

The mere act of superheating may appear simple enough, but it differs essentially from all other operations in steam production. The fluids are so different to which heat is to be applied. Water may be heated in a tube, and so long as, by flow or other means, the water and the tube are maintained in contact, it would seem that an excess of temperature can scarcely be applied. There is even reason to believe that the hotter the water the better it will take heat from the tube, and there are certainly good reasons to suppose that water just ready to flash into steam is even better as a receptive agent because of its latent heat absorption. Water of itself has, per pound, a heat absorption about double that of steam. Per cubic foot the heat absorbed by water is enormously greater, but even this difference is many times multiplied when the cubic foot of water is becoming steam.

Thus in heating steam in hot pipes the steam has a low cooling effect. As it dries it ceases to acquire heat by radiation from the hot metal; it can only acquire it by contact and friction. Being of small mass, however, it is apt to become overheated, especially since the tubes must be very much hotter than the desired temperature of superheat if any commercial efficiency of apparatus is to be secured. At every turn there are difficulties to be met, and the operation of superheating is one that has to be carried out on a basis of continual compromise between conflicting factors.

The Mileage Basis of Inspecting Cars and the Elimination of Guess Work in Inspection

There is a decided tendency in the larger electric railway repair shops to adopt the mileage system of inspecting and overhauling cars. Usually the change from the time basis results in a considerable decrease in operating expenses, caused by a reduction in both labor and materials required to keep the cars in order. Moreover there are usually fewer detentions and delays when the mileage basis of overhauling is used.

Common sense and reason uphold the mileage rather than the time system, and the only wonder is that it has not always been employed on both large and small roads. The time basis is too indefinite and the element of guesswork is too prominent in it. Some actual figures from one road which uses the mileage basis shows that the cars make 1200 miles, the limit for oiling and inspection, in from three to seven days. Probably if the time system were in use on this road the cars would be inspected, say, every five days. But this would result in over-inspecting some of the cars and under-inspecting others. Over-inspection would mean, of course, direct loss of a great deal of labor and materials and under-inspection would endanger the apparatus and increase the liability of detentions.

The argument might be brought up that the interval between inspections can be made of such a length that none of the cars will be under-inspected, and, further, that over-inspection simply decreases to a greater extent the liability to break down. Both sides of this argument are badly at fault. In the first place, if inspecting a car that makes the 1200 miles in three days, at five days or 2000-mile intervals, is not under-inspection, then, assuming all the cars to be of the same type and to be in similar service, to inspect on a 1200-mile basis is to increase the cost of inspection 40 per cent over that necessary. The second part of the argument, that over-inspection decreases the liability to break down, does not work out in practice. The inspectors on such cars will soon realize that the cars do not really need inspection and they will be less thorough with their work. Carelessness will soon be extended to those cars needing inspection, and soon the whole force is likely to become slipshod in its methods.

About the only objection to the mileage basis is the trouble of obtaining the mileage reports and then of getting cars into the shops when they are reported for inspection. Keeping records, it is true, does cost money and can be carried too far, as the political economist puts it, "beyond the point of diminishing returns," but it is safe to say that keeping car mileage for the purpose of inspecting on a mileage basis will certainly yield good returns for the money spent.

Even when the mileage basis is used, it is usually the best plan to depend as little as possible on the discretionary powers of the inspector. Where cars of the same type are in the same service and are in good condition, it stands to reason that for equal mileage, the bearings of all cars require equal amounts of oil, that the waste should be subjected to the same treatment, that about the same amount of dust will collect on the controller parts, and in general that all parts of all cars will require the same treatment. Rather than allow an oiler to open a bearing and judge of the amount of oil required and then tip his can and judge again as to the amount of oil he puts in, reason dictates that it would be far better to give instructions that bearings are to receive, say a gill of oil and then to supply him with a gill measure and make him use it.

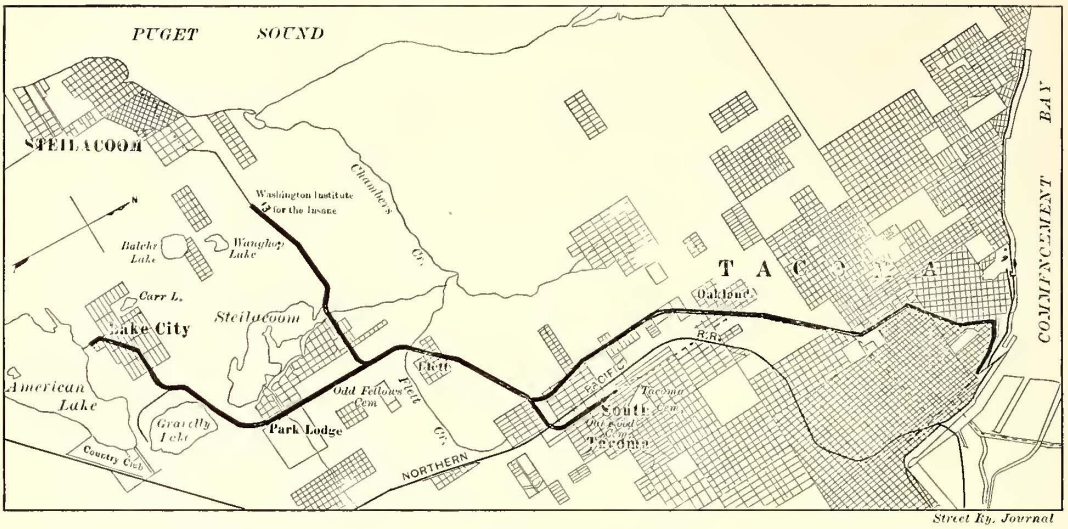
In the same manner, dependence on the judgment of the inspector can be eliminated with regard to armature clearance. When it comes to estimating sixteenths or thirty-seconds of an inch in a dark motor with the head turned sidewise and the eye not on a line with the pole face, the judgment of most men is likely to be rather misleading. Moreover what one man thinks is likely to differ considerably from what another one believes to be proper clearance. The use of a gage which will take probably half an hour of a machinist's time to make, will eliminate all uncertainty regarding clearance.

There are many other features of car inspection that can, in a similar manner, be reduced to definiteness, and the company that continues to let guess work and dependence on the judgment of the inspector or workman continue to exist, it is very safe to say, is losing a great deal of money.

No work about a car shop is more important than the inspection of cars, and master mechanics do wrong when they turn this work over to subordinates and then do not bother themselves with the way in which it is executed.

THE PACIFIC TRACTION COMPANY, TACOMA, WASHINGTON

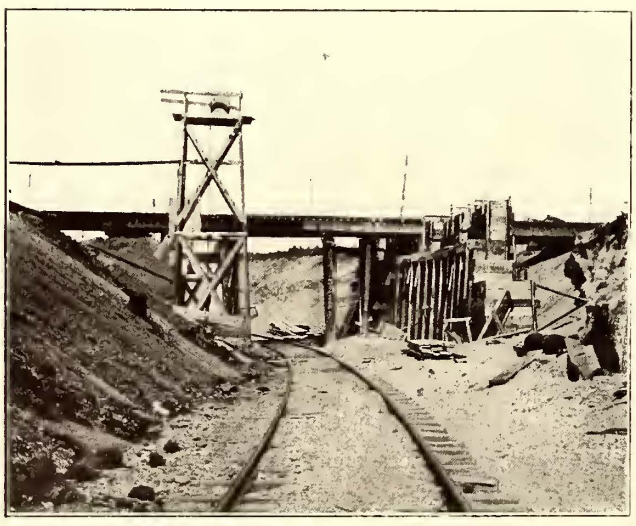
Twelve miles south of Tacoma, Wash., lies American Lake, which has long been a summer play ground for the people of Tacoma, but was difficult of access until the construction of the Pacific Traction Company's line. Heretofore the lake could be reached only by the local trains of the Northern Pacific Railway, and these did not run at convenient hours. Appreciating that there lay a profitable field for an electric railway, several enterprising Tacoma business men, among them E. J. Felt, interested Eastern capital in the project and in the fall of 1905 organized the Pacific Traction Company, nominally to build a suburban electric railway from Tacoma to American Lake. Work was commenced on the new system the following May, but was delayed considerably last winter by bad weather. However, the first passenger cars were run from Tacoma to Lake City, July 4, 1907. The new system is independent and in fact is in competition with the present city and suburban lines of the Tacoma Railway & Power Company.



MAP OF TERRITORY COVERED BY THE PACIFIC TRACTION COMPANY OF TACOMA

The constructed main line from Tacoma to Lake City is 12½ miles long, and outside of the corporate limits of the city is built on a private right of way 60 ft. wide. A 4-mile branch to Steilacoom, a suburb of Tacoma, on Puget Sound, and a 1½-mile branch to the suburb of South Tacoma bring the total constructed mileage up to 18. In addition to this there is under construction a 1½-mile extension of the South Tacoma branch, and also a 2-mile double-track line down Fifteenth Street and up Pacific Avenue to the terminus of the main line. The company has exceeded the bounds of its original plans and is now engaged in buying right of way for a 35-mile extension to Olympia, the State capital.

In the streets the track follows the established grades, some of which are as heavy as 6 per cent. The track construction through the paved district is worthy of note. No ties are used. The 7-in., 70-lb., 60-ft. rails are laid directly on top of a 10-in. x 14-in. continuous concrete stringer. The concrete mixture is 1:3:5, cement, sand and clean beach gravel respectively. Every 10 ft. a ⅝-in. rod is used. The tops of the stringers were laid about ½ in. below grade for base of rail as given by the profile; then the track was laid and the rails brought up to grade with light shims; a rich grout of 1 to 1 cement and sand then was poured in between the rail and stringer and around the base of the rail. The whole was finally surrounded with 6-in. concrete paving and allowed to set. The ball of the rail is faced on both sides with vitrified brick; on the outside the bricks are laid parallel to the rail; on the inside they are set at right angles to it with one corner chipped for the flangeway.



CROSSING UNDER THE NORTHERN PACIFIC RAILWAY

A VIEW OF AMERICAN LAKE AT THE TERMINUS OF THE PACIFIC TRACTION COMPANY'S LINE

Beyond the city the track is standard, light construction, using 60-lb. steel rails, not braced on curves. The track is surfaced with gravel, which is abundant and cheap. The grades are light; with the exception of a few velocity grades approaching the crossings of narrow ravines they do not exceed 1.5 per cent. There is one commendable feature

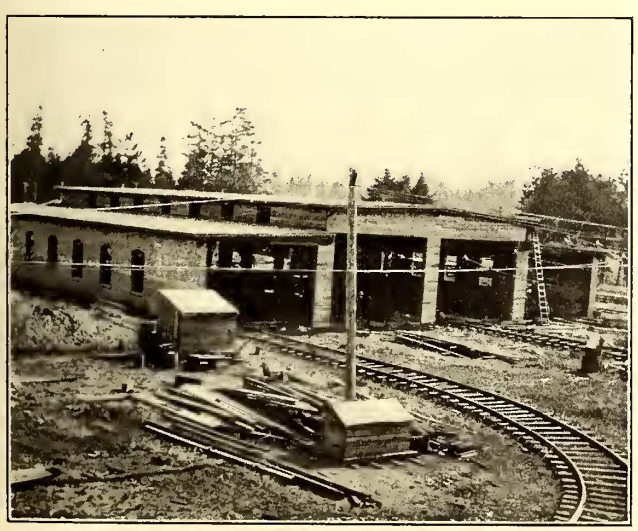
about the line in general that differentiates it from many other electric railways in the Far West; this is that the company has not sacrificed its alignment or grade to avoid expensive cuts and fills, and aside from a few curves, the line compares favorably with Western steam railroads.

Folowing the standard practice of the region the bridges are all wooden trestles; they are strongly built and could carry 100-ton locomotives with safety. The most notable is the Cliff Avenue viaduct near Third Street S. This is 350 ft. long and 60 ft. high, double track, planked and furnished with sidewalks. Between the rails the planks are laid 45 degs. to the rail. Just west of this bridge is a bulkhead 300 ft. long and 18 ft. high, built to keep the tracks from sliding down into the bay several hundred feet below. The bulkhead is unusually massive, being constructed of long 12-in. x 12-in. timbers tied into the roadbed by 6-in. x 8-in. cross-braces.

The overhead construction is neat and strong and with two exceptions standard in design and construction. The insulators, guy and supporting wires and cables are heavily galvanized; usually in this locality they are black, but it is expected that the galvanized work will withstand the damp, salt, foggy weather of winter better than if it were unprotected; the trolley wire used is No. 0000 Fig. 8 hard-drawn copper and is said to be the heaviest wire now in service on the Pacific Coast.

Near South Tacoma the company has purchased three acres and built a 150-ft. x 150-ft. brick car house for sixteen cars on eight tracks. Slow-burning mill construction is used throughout.

Near the car house is a $20,000 two-track concrete crossing, under the four-track main line of the Northern Pacific Railway. The four railway tracks are carried on concrete girders supported by concrete abutment walls. A grade crossing would have been much cheaper at this point, but in constructing the under-crossing, the company has shown a wise desire to avoid accidents, and, again, builded better than the average electric railway. The track was laid by a machine of local design. Good results were obtained with

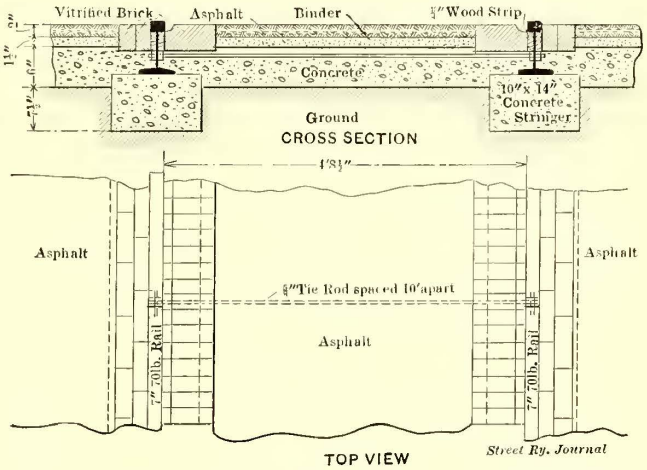


THE SOUTH TACOMA CAR HOUSE

it and 1½ miles laid a day at a cost considerably below what it would have been had the work been done entirely by hand.

The cars are among the largest in street railway service on the coast. They are 55 ft. long, weigh 56,000 lbs., are fitted with four 40-hp motors, air brakes, two controllers and trolleys. They were built by the American Car Company.

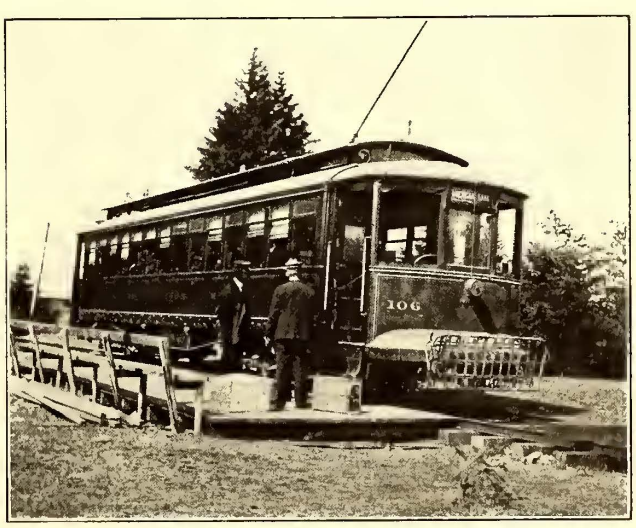
Except on Cliff Avenue the line is single track with automatic turnouts. Spring-rail frogs are used with the free flangeway leading onto the turnout from one end on to the main line from the other. The cars are run on schedule, protected by United States automatic electric block signals. Telephones are installed at convenient intervals.



TRACK CONSTRUCTION ON THE CITY LINES OF THE PACIFIC TRACTION COMPANY

Little has been done so far on the terminal work at either end. The company owns considerable property at American Lake which it is selling to summer residents. It is the policy of the company to foster an increase of permanent residents who will patronize the line rather than to establish any amusement features of a Coney Island nature at American Lake. The company has no power plant, as it purchases all of its power at 600 volts d. c. from the Seattle-Tacoma Power Company.

The officers of the Pacific Traction Company are: President, A. G. Corbett; vice-president and secretary, E. J. Felt; second vice-president, G. M. Smilaix; general manager, Benj. J. Weeks.



STANDARD 55-FT. INTERURBAN CAR OF THE PACIFIC TRACTION COMPANY

General Manager McCulloch, of the United Railways of St. Louis, has presented to the employees' band a set of new instruments, costing $8,000.

NOTES ON PHILADELPHIA ELEVATED PRACTICE

The recent opening of regular service on the Market Street subway-elevated line of the Philadelphia Rapid Transit Company makes appropriate some references to the practice adopted by the company in connection with this branch of its service.

WEST PHILADELPHIA SHOPS

All of the rolling stock used on the Market Street line is cared for in the shops especially built for them at the West Philadelphia terminal. As the constructional features of these shops were described in the STREET RAILWAY JOURNAL for Sept. 23, 1905, it is only necessary now to mention the operating equipment and the methods for doing the work, which will be of maintenance character only. The machine tools were all furnished by the Niles-Bement-Pond Company, excepting a Bickford radial drill. They embrace a wheel-turning lathe, wheel press, radial boring drill, radial drill, a 24-in. and a 36-in. lathe, Bement-Niles shaper, and a LeBlond lathe. All of these tools are driven by the Electro Dynamic Company's inter-pole motors, which are operating very satisfactorily. In addition to the tools mentioned, there is one Diamond Machine Company's grinder. There is no other apparatus in the shop proper in addition to the foregoing except a 15-ton Box crane for the carriage of parts from tool to tool.

Some of the accompanying forms indicate the methods of caring for labor and material. Every shopman is furnished with a daily time card on which he assigns the number of hours spent on different

STATEMENT OF
OILS AND GREASE CONSUMED DURING MONTH OF _____ 190

BY _____

MR. _____

_____ 190

	On Hand		Received During Month of		On Hand First Day of		Amount Consumed for Month of	
	Gallons	Pounds	Gallons	Pounds	Gallons	Pounds	Gallons	Pounds
Galena P. H. Valve Oil								
" " Engine "								
" Dynamo "								
" Turbine "								
" Crank Case "								
" Air Compressor "								
" Electric Car "								
" Track "								
" Gear Grease								
" Perf. Signal								
" Motor Grease								
Miscellaneous								

YOURS VERY TRULY,

KILOWATTS _____ DIV. NO. _____

MILEAGE _____ FOREMAN OR ENGINEER.

RECORD OF GREASE AND OIL CONSUMED, ON HAND, ETC.

Philadelphia Rapid Transit Company,
ELEVATED DIVISION

Date, _____ *190*

Mr F. H. LINCOLN,
Asst. General Manager

We have this day charged the following to Maintenance of the Elevated Division:

CHARGE	Amount
Bodies,	
Trucks,	
Motors,	
Control,	
Air Brakes,	
Air Doors,	
Headlights and Markers,	
Tail-lights and Lanterns,	
Third Rail,	
Cleaning and Supplies,	
M of E Miscellaneous,	
Depot Expense,	
Trans. Miscellaneous,	
Office Expense,	
Total.	

_____ *Purchasing Agent.*

DAILY REPORT TO ASSISTANT GENERAL MANAGER ON MATERIAL USED BY THE ELEVATED DIVISION

PHILADELPHIA RAPID TRANSIT COMPANY. Distribution of Elevated Car Shop Labor, 190

NAMES	Rate per Hr.	Bodies		Trucks		Motors		Control		Air Brakes		Air Doors		Headlights & Markers		Tail-lights & Lanterns		Third Rail		Supplies		M. of E. Miscellan'y		Cleaning & Supplies		Transp'n Miscellan'y		Depot Expense		Office Expense		Heat		Light										Shop Pr'ts & Tools		Car Equipment								TOTAL		REMARKS
		Hrs.	Amount	Hrs.	Amount	Hrs.	Amount	Hrs.	Amount	Hrs.	Amount	Hrs.	Amount	Hrs.	Amount	Hrs.	Amount	Hrs.	Amount	Hrs.	Amount	Hrs.	Amount	Hrs.	Amount	Hrs.	Amount	Hrs.	Amount	Hrs.	Amount	Hrs.	Amount										Hrs.	Amount	Hrs.	Amount					Hrs.	Amount	

DISTRIBUTION OF ELEVATED CAR-SHOP LABOR

RECORD OILING CARS. Month of _____ 190__

CAR NO.	DAY OF MONTH 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	REMARKS

_____ Barn _____ Division

_____ Foreman

NOTE: Mark / indicates Motor Bearings have been oiled that day.
" X " " Journal " " " " " " "
" ✖ " " Both Motor and Journal Bearings have been oiled that day.

CAR OILING RECORD WITH SYMBOLS COVERING DIFFERENT KINDS OF LUBRICATING WORK

jobs. This information is afterward transferred to a large sheet covering the distribution of elevated car shop labor as

performed by every employee, but the proper account numbers are assigned only by the main office to which the sheet is sent. Another form illustrates the method adopted in charging up material taken from the storeroom for the maintenance of elevated equipment. This is inspected

Philadelphia Rapid Transit Co.

ELEVATED DIVISION.

Motorman's Report of Defects and Train Detentions.

THIS COPY TO SUPERINTENDENT AT TERMINAL.

Date,.................... 190 Train No.............

Total Length of Detention,........................

Conductor,.............. Motorman,..............

CAR No.	MINUTES	PLACE OF DETENTION	CAUSE OF DETENTION

One of these to be filled out in Duplicate for each Car upon leaving train.

MOTORMAN'S REPORT OF DEFECTS AND TRAIN DETENTIONS

every day by the purchasing agent of the company and then sent to the assistant general manager for his attention.

The company has a cost-per-mile contract with the Galena Signal Oil Company, and particular care is taken, therefore, to keep track of the amounts of each kind of oil used. Two

Form 530. 5000. 3-29-07

TIME CARD.

Phila. Rapid Transit Company.

ELEVATED DIVISION.

This Card must be made out each night before leaving.

Hours on

Hours on

Hours on

Hours on

Hours on

Hours on

Hours on

..................Workman.

Rate per hour,

..................Foreman.

Date,.................. 190

SHOP EMPLOYEE'S TIME CARD

forms are employed in this connection, one covering the amounts received, used and on hand; the other is a lubrication record of every car. An inspection of the latter will show some of the convenient symbols adopted to simplify the work of the shopmen in making out oiling reports. This form is a large sheet, which is kept on a board covered with a piece of oilcloth lifted only whenever the shopman wishes to indicate the class of lubrication done on certain cars.

CAR-MAINTENANCE PRACTICE

Every motorman is furnished with a book pad 4 ins. x 8 ins., which contains a form called "Motorman's Report

REPORTS OF

Defects and Train Detentions

ELEVATED DIVISION

Philadelphia Rapid Transit Company

COVER OF MOTORMAN'S REPORT BOOK

LIST OF DEFECTIVE EQUIPMENT FOR USE IN REPORTING TRAIN DETENTIONS

MASTER CONTROL:
Control Fuse Blown
Controller Switch
Circuit Breaker Switch
Train Cable
Train Cable Jumper
Current Limit Relay
Potential Relay
Controller
Jumps in Series
Jumps in Parallel
Slow in Parallel
Slow in Series

MOTOR CONTROL:
Main Fuse
Shoe Fuse
Contactors Sticking
Reverser
Resistance Grids
Circuit Breaker

MOTORS:
Flash Overs
Grounded Armature
Short Circuited Armature
Open Circuited Armature
Grounded Field
Dropped Brush Holder
Motor Leads
Motors Cut Out
Broken Gears
Loose Gears
Broken Pinion

HEAD LIGHT:
Burnt Out
Fuse Blown

GAUGE LIGHTS:
Burnt Out

TAIL LIGHTS: (Oil)
Will Not Burn

HOT BEARINGS:
Armature
Motor Axle
Journal
Compressor Motor

COUPLERS:
Defective

TRUCK TROUBLES:
Contact Shoes
Contact Shoe Beam

AIR BRAKES:
Compressor Fuse Blown
Brake and Buzzer Resistance
Governor Does Not Cut Out
Brakes Failed to Release
Brakes Equalizing
Brake Rigging
Defective Coupler
Defective Piping
Brakes Cut Out
Emergency Attachment Cut Out
Feed, Triple, Brake Valves
Drain Cock

WHISTLE:
Whistle Out of Order

CLASSIFICATION LAMPS AND BUZZER

MISCELLANEOUS:

DATA ON INSIDE COVER OF MOTORMAN'S REPORT BOOK

Market St. Elevated Pass. Ry. Co.

CONDUCTOR'S DAILY MILEAGE SLIP.

Name,..................

Badge,.......... Date,..........

RUN	CAR Nos.	TRIPS	TERMINAL Left	TERMINAL Arrived

This Slip must be made out each day and turned in to Office.

CONDUCTOR'S DAILY MILEAGE SLIP

of Defects and Train Detentions." This is submitted in duplicate to the division superintendent at the terminal and must cover separately each car affected. One copy of the report is sent to the mechanical department while the other is retained by the operating department. After the necessary repairs have been made the shop copy is forwarded for filing to the superintendent's office. For the convenience of the motorman in making out reports the inside cover of the report book contains a list of troubles to which different parts of the equipment are liable to be subjected. The method of making up the report forms has been found very convenient, because a large number of blanks can be kept in shape so easily in the pocket and there is less trouble in writing than if detached sheets were used.

Form 531. 1000. 3-29-07

ELEVATED DIVISION,

69th Street Shop.

Date,.................. 190

..................Superintendent.

The following Cars were inspected this date and are now ready for service:

Car No.	Car No.	Car No.	REMARKS

..................Shop Supt.

FORM USED IN RETURNING CARS TO SERVICE

The motorman's reports on defective equipment are supplemented by the yardmaster's daily report on "Trains

taken off." This gives the superintendent an opportunity of knowing whether the motormen are turning in correct reports or simply making groundless complaints.

The cars are inspected thoroughly after running 1200 miles, whether or not defects have been reported. This work is done by the shop on receipt of a notice from the superintendent of the elevated division that cars numbered so and so are due for inspection. The yardmaster then takes the cars out of service and inspection is made the following day.

The information upon which the division superintendent orders cars to be inspected is collated from the daily report slips turned in by the conductors, which, in turn, are transferred to a monthly mileage sheet covering every car on the system. On completion, this monthly sheet is sent to the main office of the company for record.

In connection with the maintenance of the cars it is interesting to note that the monolithic flooring used in the latter has proved very economical from the cleaning standpoint, as but six men are required to keep the flooring of the forty cars in perfect shape.

Form 518. 500. 3-6-07

Market Street Elevated Passenger Railway Company,

PHILADELPHIA RAPID TRANSIT COMPANY.—Lessee.

MILEAGE SHEET.

Date, _____ 190

Date	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Total
CAR 1																																
2																																
3																																
4																																
5																																
6																																

MONTHLY MILEAGE SHEET COVERING ALL THE CARS ON THE MARKET STREET ELEVATED-SUBWAY LINE OF THE PHILADELPHIA RAPID TRANSIT COMPANY

Market Street Elevated Passenger Railway Co.,

OPERATING DEPARTMENT.

NSTRUCTION BLANK.

MOTORMAN.

Date, _____ *190*

Motorman _____ *Badge No.* _____

Mr. _____, Student Motorman, has been assigned to you to be instructed in the duties of a Motorman on this Division.

All Instructing Motormen must see that Students thoroughly understand the operation of trains in accordance with Rules and Regulations of this Company, and are fully acquainted with all conditions, a knowledge of which is necessary for safe operation over this Division.

Instructing Motormen will be in charge of trains and will be responsible for their safe operation. They will permit Students to operate trains only when in their judgment it is safe for them to do so.

I have instructed Student Motorman _____ Badge No. _____ in the safe operation of a train in service and have fully acquainted him with all signals, speed limits, station stops and general conditions existing on the Elevated Division :

DATE	LINE	No. TRIPS	SIGNATURE INSTRUCTOR	BADGE No.

I have received instruction from all Motormen whose names appear above, in the safe operation of a train in service, and have been fully advised as to all signals, speed limits, station stops and general conditions existing on the Elevated Division.

_____ 190 *Signature,* _____

_____ *Sup't Elevated Division.*

I have examined the Student whose name appears above, and am fully satisfied that he is competent to operate a train with safety and according to Rules and Regulations of this Company.

Inspector.

MOTORMAN'S INSTRUCTION BLANK

Market Street Elevated Passenger Railway Co.,

OPERATING DEPARTMENT.

INSTRUCTION BLANK.

CONDUCTOR.

Date, _____ *190*

Conductor _____ *Badge* _____
_____ *Badge* _____
_____ *Badge* _____
_____ *Badge* _____

Mr. _____ has been assigned to you to be instructed in the duties of Conductor on this Division.

DATE	DIVISION	No. TRIPS	INSTRUCTOR	BADGE	REMARKS

Mr. L. McCOUBRIE,
Sup't Elevated Division.

Dear Sir:—I have instructed Mr. _____ in the duties of Conductor on this Division, and pronounce him to be fully competent to act as such.

(Badge)

Conductor _____
_____
_____
_____

CONDUCTOR'S INSTRUCTION BLANK

EMPLOYING TRAINMEN

Thus far, all of the trainmen in the elevated service are former employees of the surface division, as the company preferred to begin operation with tried men. Ten hours make up the usual day's work. Applicants for the position of conductor are first taken on as trainmen.

Motormen are instructed for fifteen to eighteen days under different men, after which they are turned over to an inspector, who takes the student to the shops and puts him through a course of trouble-hunting and correction. After a satisfactory number of trials he is turned over to the division superintendent for assignment. Trainmen are also instructed by several conductors before they are turned over to the superintendent.

TRAIN OPERATION

All trains are dispatched from the Sixty-Ninth Street terminal, from which point a daily report is made for the superintendent's office. The dispatcher indicates how many trains were operated during the day, whether of two or three cars and how close they kept to the schedule. At the present time the trip is made in 19 minutes and the headway during rush hours is 4 minutes. There have been no serious delays of any kind ever since opening of the service.

Market Street Elevated Passenger Railway Company.

Switchman's Daily Report of Trains Taken Off. Date, 190

Train Number	Car Number	Motorman's Badge	Time A.M. P.M.	CAUSE	REMARKS

YARDMAN'S DAILY REPORT OF TRAINS TAKEN OFF

Market Street Elevated Passenger Railway Company,

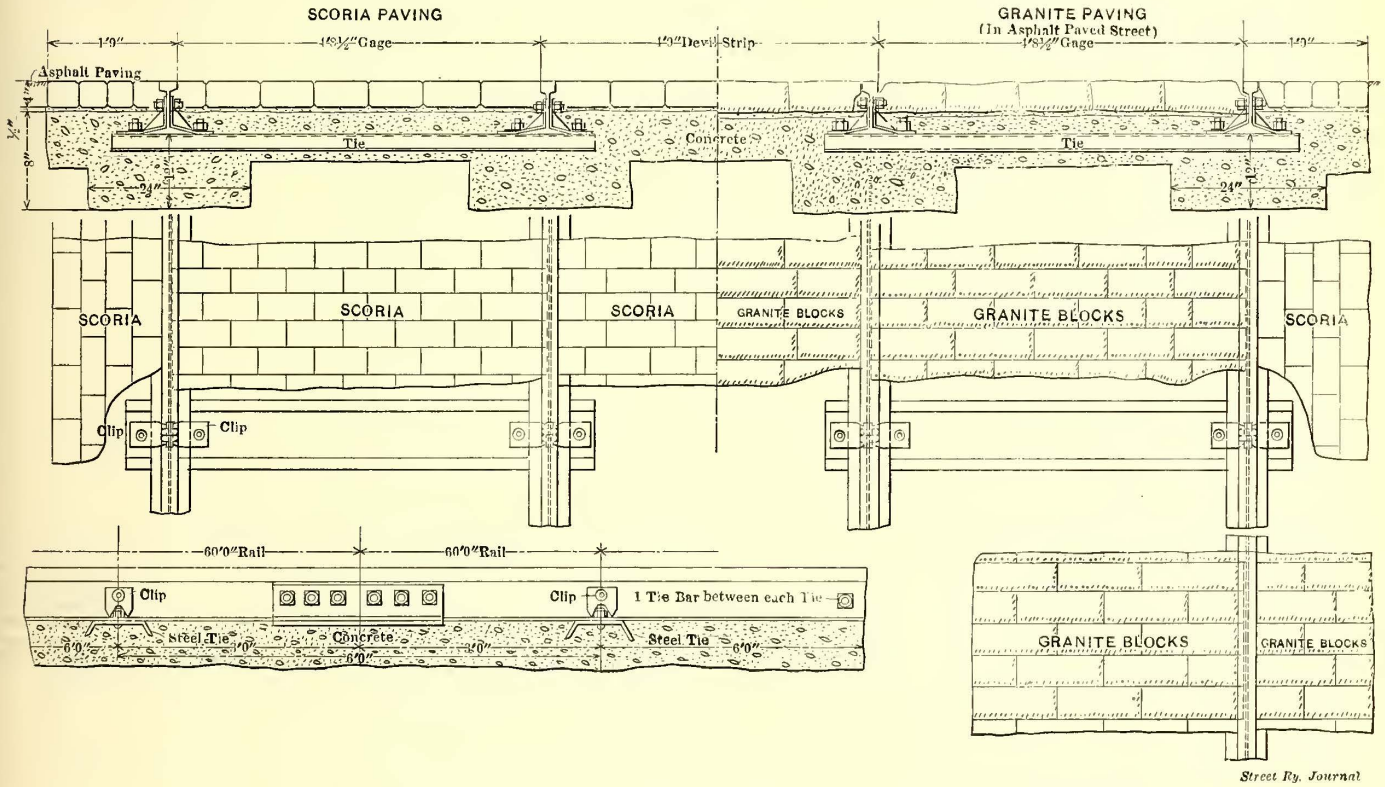
PHILADELPHIA RAPID TRANSIT COMPANY, Lessee.

Tower, Signal Station,

DAILY REPORT OF TRAINS. Date, 190

To be Rolled and Sent to Superintendent's Office.

DISPATCHER'S DAILY REPORT OF TRAINS



Street Ry. Journal

TWO TYPES OF STEEL-TIE TRACK CONSTRUCTION ADOPTED IN MONTREAL

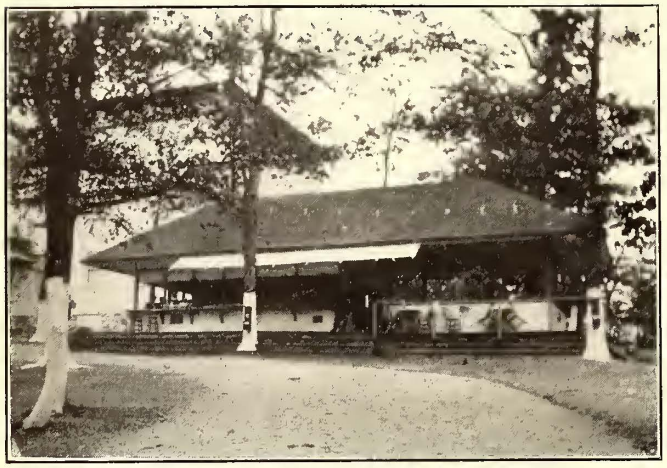
MONTREAL TRACK RECONSTRUCTION WITH STEEL TIES

During the last two years the Montreal Street Railway Company has relaid 75 per cent of its city track, replacing 70-lb. grooved rail with 90-lb. T-rail and continuous joints. The accompanying drawing shows the type of track construction with both scoria and granite paving. In both cases steel ties are laid 6-ft. centers in an 8-in. concrete foundation, with one tie-rod between each pair of ties. The concrete is separated from the paving blocks by a ½ in. layer of sand. The cost of this renewal work is about $25,000 per mile, this high cost being ascribed principally to the advance in rails.

As a test of long distance speed endurance Union Pacific motor car No. 12 had made a continuous run from Omaha to Denver in 16 hours 34 minutes. The running time of the regular Denver fast train is 17 hours 15 minutes for 570 miles.

HIGHLAND PARK, YORK, PA.

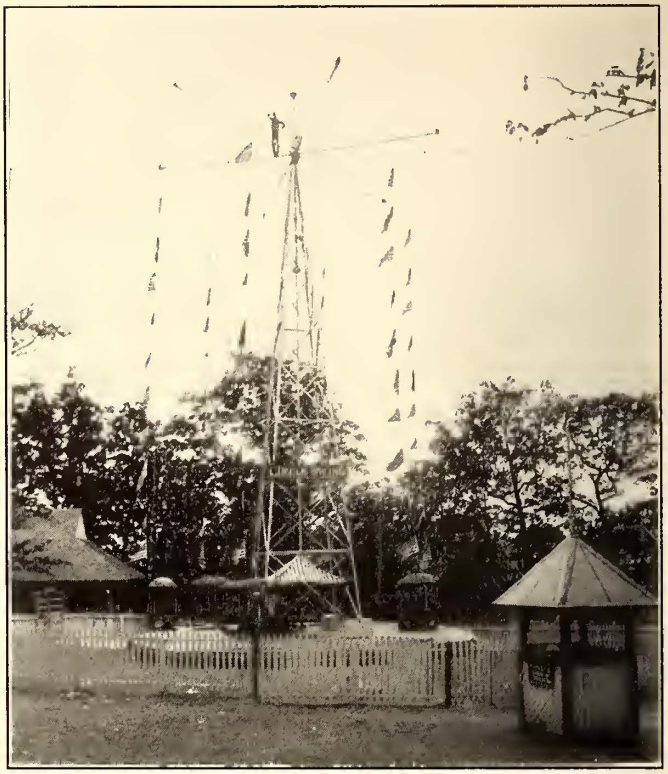
The York Street Railway Company has transformed Highland Park, York, from an obscure wooded hillside to a popular pleasure park, where there is now almost every form of amusement and entertainment. The resort is situated about 2 miles from the center of the city and is reached by either of two trolley lines in about fifteen minutes for a single fare, which includes admission to the park. Thirty thousand



THE RESTAURANT AND LUNCH ROOM

dollars was the outlay in money to effect the change. Highland is a picturesque spot, its natural elements alone making it attractive. Coursing along the edge of the wooded land is the famous old Codorus Creek. This stream traverses the city in the form of an S, and is crossed by a bridge at every street that is extended. It has been taken advantage of by the railway management, which has provided small boats and keepers to look after those who desire to enjoy boating and other water pastimes.

The most important and pretentious attraction is a new theatre, which has a seating capacity of about 1500. This structure is modern in all its details, as shown in the view presented herewith of the stage and the interior of the building. Entertainments are given twice daily, in the

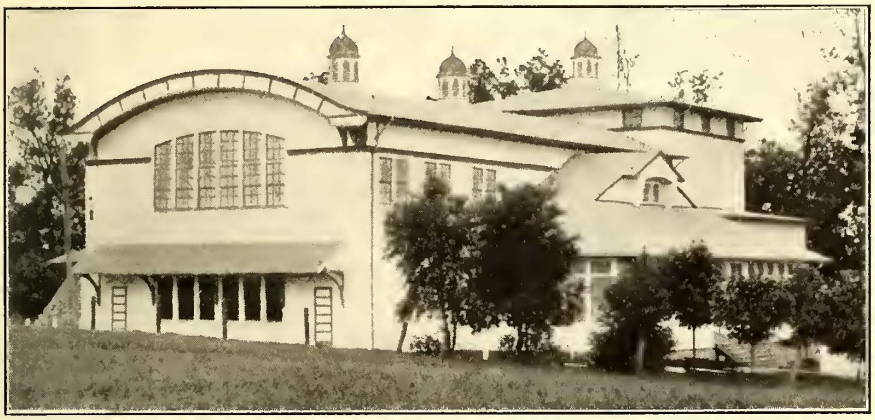


THE CIRCLE SWING, A POPULAR AMUSEMENT DEVICE

afternoon and the evening. The average daily attendance is about 1000. On Saturday evening, however, this is swelled to the number of about 1300 to 1500. The admission charged is 10 and 20 cents for reserved seats. Matinees are held every Wednesday and Saturday afternoon and holidays. The attractions at the theatre include drama, melodrama and comedy, given by a stock company of fourteen

THE ENTRANCE TO THE PARK, SHOWING TROLLEY TERMINUS

people. There is a regular orchestra of eight pieces every evening and piano music during the matinee. The stage is 48 ft. wide, 34 ft. deep and 40 ft. high. All the latest improvements for electrical effects in the hanging of scenery and curtain moving have been installed. The theater is



EXTERIOR OF THE THEATER

lighted with 500 8-cp, 220-volt lamps and 200 16-cp, 110-volt lamps.

Among the other attractions are a dancing pavilion, circle swing, merry-go-round, roller coaster and penny arcade. The dancing pavilion is especially popular. It will accommodate about 2000 people. An admission is charged at the door and a numbered tag given so as to identify the dancer. The dancing is continued from 7:30 to 11:30. The admission is 15 cents for gentlemen and 10 cents for ladies.

The skating rink is one of the finest in the vicinity of York. The skater is charged 10 cents for admission and 20 cents for skates. Booths are arranged for the comfort of the skaters, and the stock rooms so placed that skates can be obtained with little or no trouble. In addition, there are cloak rooms, umbrella stands and other checking stations for the accommodation of patrons. A new skating rink is being constructed, however, at a cost of $18,000. This will be 250 ft. long by 75 ft. wide, and will be operated both summer and winter.

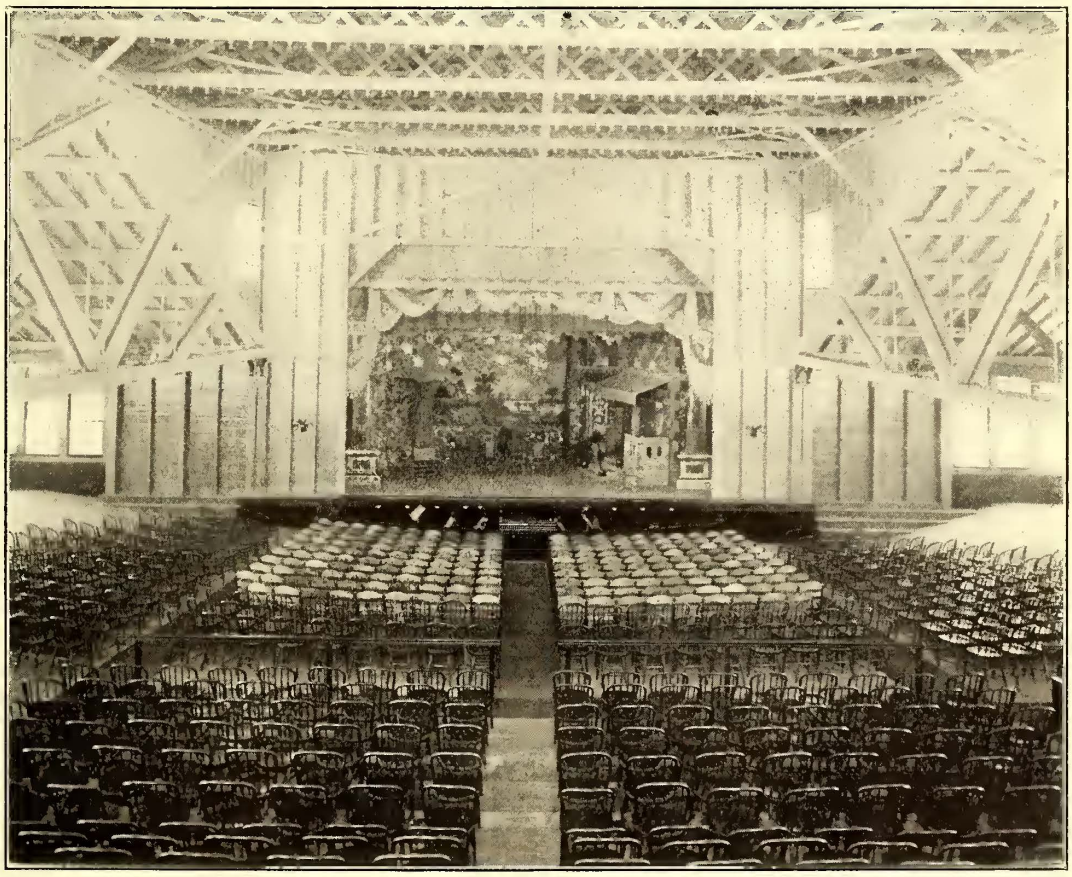
The penny arcade, slot machines and other forms of amusement are rented to individuals who make their own charges and pay to the company a percentage of their daily receipts, thus insuring the company a fixed income from these sources.

A lunch room is located on the grounds not far distant from the theater, and here quick lunch and soft drinks are furnished. About one hundred people can be accommodated at a time. This, too, is a concession, and is awarded to outside interests who are under special obligation to the street railway company.

A picnic grove has been provided and is especially popular, whole families from York and neighboring towns coming to the park time and again to enjoy the freedom of the grounds, and to permit the children to romp through the grove. The only expenditure required in this section was for tables.

The park is lighted at night with approximately 10,000 electric lights furnished by one of the local electric light companies at York, which secures power from the plant of the York Haven Water & Power Company at York Haven.

This is the first season for these various forms of amusement, and although the weather has been unfavorable, the attractions operated by the company have more than met the expectations of David Young, Jr., general



INTERIOR OF THEATER, SHOWING SEATING ARRANGEMENT AND STAGE SETTING

manager, and J. E. Wayne, superintendent of the York Street Railway, who are solely in charge of the park, and whose purpose it is to make the park an enticing place of amusement and so convert it into a source of steady revenue to the company. The fact that a single fare only is charged, which includes admission to the park, and that

patrons are not prevented from legitimately enjoying themselves has made the park extremely popular with all classes. Taking into consideration the fact that York is a city of only 35,000, the average daily attendance at the park of 7000 illustrates the popularity of the resort. The Sunday attendance is about 15,000. On holidays the attendance varies between 12,000 and 15,000.

INTERIOR OF PARK, SHOWING ARRANGEMENT OF BUILDINGS

TRACK AND WHEEL BRAKE PRACTICE IN ENGLAND AND GERMANY COMPARED

A recent number of the "Zeitschrift für Kleinbahnen" contained an article by W. Hildebrand discussing the reasons for difference in British and German braking practice, especially the wide use of the track or slipper brake in the United Kingdom, while the wheel brake is preferred in Germany. Mr. Hildebrand groups his arguments under four heads:

(1) The moist British atmosphere and the fine coal dust held in suspension make the rails slippery and so greatly reduce the holding power of the wheel on the rail.

(2) The motor cars in Great Britain are usually of the double-deck type with a high center of gravity. Consequently during braking the load on the rear axles or truck is greatly reduced and the wheels slide unless the braking weight to be cared for by the wheel brake is very low from the start.

(3) Trailers are not used in England, so track brakes are more easily manipulated; moreover their high cost is confined to one car only in place of a train as in Germany.

(4) The English Board of Trade rules make the use of a track brake compulsory, the traction managers being obliged to use some brake of that type. Among them the Westinghouse-Newell track brake, which is also a wheel brake, appears to have many advantages. Nevertheless it is noteworthy that the simple track brake in which the shoes are pressed against the rails to relieve the wheels is still extensively used in England although long discarded by German engineers.

Even in England, track brakes are used mainly for emergencies, apparently because they operate with too much shock to passengers and cars to be used for ordinary braking. The use of two independent sets of brakes cannot be considered advisable as too much reliance is placed on the motorman's presence of mind in emergencies.

In this connection the question of automatic track sanding is of importance, particularly to prevent the wheels from sliding when maximum braking pressure is applied. The sliding of the wheels so greatly diminishes the effective braking power that many accidents are due to it. It is a striking fact that this sliding depends upon the abruptness of the application of braking power. This accounts for the fewer flat wheels under air-brake operation, because the air pressure requires an appreciable period to attain the maximum and in this respect air is superior to electric braking.

NEW POWER EQUIPMENT FOR HARTFORD

The Consolidated Railway Company, of Connecticut, has just decided upon an important extension to its power station in Hartford. A new intake tunnel 200 ft. long will be built to the Connecticut River, new apparatus will be installed and a water-side coal pocket erected. The new generating apparatus will include turbines and alternators aggregating 750 kw. The alternating current will be used for the new Rockline-Hartford service soon to be begun, but until the new machines are ready, the Hartford Electric Light Company will supply power for this line from its plant at Dutch Point. The sub-stations for the line are all in, and as previously stated, the service is about ready to be started.

The "Tri-State Tourist" publishes the following schedule of the trip by trolley from Scollay Square, Boston, to Portland, Me., recently made possible by the opening of the Atlantic Shore Line's extension, which shows the entire route with the miles, fare, running time and changing points:

To	Miles	Fare	Time
*Salem	14½	$ .20	1:15
*Beverly	16½	.25	1:35
Ipswich Junction	23½	.35	2:07
*Newburyport	43½	.55	3:39
Salisbury	46	.60	3:54
*Hampton Beach	55	.70	4:39
Little Boar's Head	59	.80	4:59
Rye Beach	60	.80	5:04
Rye Centre	63	.85	5:24
*Portsmouth	69	.90	5:54
*Kittery	70	.95	6:04
*York Beach	85	1.15	7:24
Ogunquit	90½	1.30	7:54
*Kennebunk	101	1.55	8:24
*Town House		1.60	
*Kennebunkport		1.65	8:46
*Biddeford	113	1.70	9:09
Old Orchard	119	1.80	9:54
Portland	133	2.00	10:54

*Change cars at these points.

REPORTING BAD ORDER CARS AT NASHVILLE

As a result of misunderstandings concerning the reports of defective cars, the Nashville Railway & Light Company has adopted a double-car tag. The tags, which are of heavy manila, are joined by perforations. One tag is filled out by the motorman or conductor when the car is turned in for

Form 276.

NASHVILLE RAILWAY & LIGHT CO.

CAR TAG No. 12350

CAR No. _____

Arrived at Car Barn _____ M.

Date _____ 190__

The following Repairs were completed _____ M.

Date _____ 190__

Signed _____

Nature of trouble reported by _____ was as follows

Car No. _____ is repaired as stated above and ready for service.

Signed _____ Barn Foreman.

NASHVILLE RAILWAY & LIGHT CO.

CAR TAG No. 12350

LINE _____

CAR No. _____

Time reported _____ M. _____ 190__

Nature of trouble reported _____

Reported by _____

Received by _____

How reported _____ Telephone _____

Written _____ Verbal _____

Reported by _____ MOTORMAN CONDUCTOR

CAR-TROUBLE TAGS. THE ONE ON THE RIGHT IS MADE OUT BY CARMEN, AND THE ONE ON THE LEFT BY THE SHOP FOREMAN AFTER REPAIRS

repairs and both are attached to the car. The blanks on the other card are filled in when the repairs are completed. The car house foreman completes the report by declaring the car ready for service over his signature.

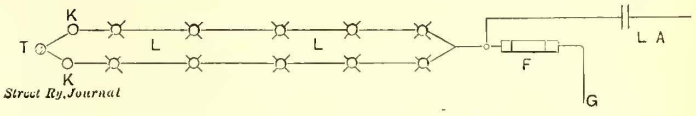
Bad order cars are also kept track of on a special blank kept in the dispatcher's office. This report is kept largely to assure of a car being reported to the car house foreman and taken off the line as soon as possible after it has been reported in bad order to the dispatcher. The car number, time reported to the dispatcher and to the car house foreman, the time the car is due at the transfer station and when taken off the line, together with the nature of the trouble, are reported. The report is made out in duplicate, one copy going to the car house foreman and the other is sent to the superintendent of transportation.

A PARTIAL CHECK ON LIGHTNING ARRESTER OPERATION

BY JOHN HOBBS

One of the best indications of a lightning arrester having worked is to find it "all blowed up." In some arresters successive lightning discharges melt fuses, which are arranged to come into action one after the other as they may be needed, but if there are more discharges than fuses it is possible that they may all go in a single storm. The following plan is tentatively proposed as a method of having ordinary arresters indicate their operation:

In the diagram L, L are two car lamp circuits protected by the usual combination switches and fuses K, K', respectively. These two lamp circuits have a common ground wire leading to a 3-amp. fuse F, which is grounded at G. The lightning arrester ground wire, which ordinarily connects to the ground direct, is connected to the positive side of this fuse. Normally the current of the lamp circuit is insufficient to melt fuse F; as the lightning arrester circuit is normally open, F is simply part of the arrester ground wire. However, if the operation of the arrester and its subsequent after current amounts to 3 amps. or more, fuse F will melt, thereby extinguishing lamps L and L. It will then be necessary to replace the fuse and thereby requalify the arrester circuit before the lamps will burn. It is, of course, possible that the arrester might operate to extinguish the arc before the current reached a value sufficient to melt fuse F, and there would then be no record of arrester operation. The limits between which this condition could obtain would be minimized by making the fusing value of F as small as possible—utilize one lamp circuit and make fuse F of as nearly 1 amp. capacity as possible. F would be placed in an accessible position and the conductor would be instructed in regard to reporting any cases of operation of the fuse.



LAMP AND FUSE CIRCUIT TO TEST LIGHTNING ARRESTERS

NASHVILLE RAILWAY & LIGHT COMPANY.

DISPATCHER'S OFFICE. TROUBLE REPORTS OF CARS.

LINE	CAR NOS.	REPORTED TO DISPATCHER	REPORTED TO BARN FOREMAN	DUE AT TRANSFER STATION	TAKEN OFF LINE	NATURE OF TROUBLE REPORTED
BROAD STREET,		M. M. M.	M. M. M.	M. M. M.	M. M. M.	
BELMONT AVENUE,		M. M. M.	M. M. M.	M. M. M.	M. M. M.	
BUENA VISTA,		M. M. M.	M. M. M.	M. M. M.	M. M. M.	
CEDAR STREET,		M. M. M.	M. M. M.	M. M. M.	M. M. M.	
FOURTH AVENUE, S.,		M. M. M.	M. M. M.	M. M. M.	M. M. M.	
FATHERLAND STREET,		M. M. M.	M. M. M.	M. M. M.	M. M. M.	
FIRST STREET,		M. M. M.	M. M. M.	M. M. M.	M. M. M.	
FAIRFIELD,		M. M. M.	M. M. M.	M. M. M.	M. M. M.	
SIXTH AVENUE, S.,		M. M. M.	M. M. M.	M. M. M.	M. M. M.	
JEFFERSON STREET,		M. M. M.	M. M. M.	M. M. M.	M. M. M.	
JO JOHNSTON AVENUE,		M. M. M.	M. M. M.	M. M. M.	M. M. M.	
ELEVENTH AVENUE, S.,		M. M. M.	M. M. M.	M. M. M.	M. M. M.	
MERIDIAN STREET,		M. M. M.	M. M. M.	M. M. M.	M. M. M.	
MAIN STREET,		M. M. M.	M. M. M.	M. M. M.	M. M. M.	

ASSEMBLY SHEET OF CAR TROUBLES COVERING ALL NASHVILLE LINES

METROPOLITAN RAILWAY ELECTRIC LOCOMOTIVES

Of the ten electric locomotives for passenger and freight service which are being supplied by the British Thomson-Houston Company, Ltd., of Rugby, to the Metropolitan Railway Company, of London, three have been delivered up to date.

These locomotives are of the double-truck type with box-shaped cab, and weigh, in running order, 47 tons. The motors with which they are equipped are of the GE 69 type with one-turn armatures, the gear ratio being 19:64 = 3.36, one motor being mounted on each of the four axles. They are of 200 hp each, and weigh, complete with gearing and gear case approximately 6100 lbs. The control is the Sprague General Electric multiple unit system.

The collector gear consists of twelve shoes arranged as follows: Two positive shoes in parallel on each side of each truck which are supported by oak beams bolted to the journal boxes. There are four negative shoes, one being attached by a suitable insulated bracket to each motor.

END VIEW OF LOCOMOTIVE, SHOWING THIRD AND FOURTH RAILS

The following are the leading dimensions:

	Ft.	Ins.
Gage	4	8½
Length over cab and headstocks	30	
Length over buffers	33	6
Truck base	17	
Wheel base of each truck	7	6
Width over cab	8	¼
Width over side sills	8	
Width overall	8	7
Height from rails to top of cab	12	3⅞
Height from rails to top of floor	4	7½
Diameter of wheels	3	2
Diameter of axles at center and in motor suspension bearings		6½
Diameter of axles at gear-wheel seat		7½
Diameter of axles at wheel seats		7 7/16
Diameter of axles at journals		5½
Length of journal		9

TRUCKS

These are of the pressed steel type strengthened with reinforcing plates, steel angles and gussets: they are fitted with a swinging bolster, built up with steel sections and steel castings. The bolster is supported on two nests of coil springs of circular section, each nest consisting of three springs. The bolster is also provided with cast-steel wearing plates, center and side-bearing plates. The side frames are supported on the axle boxes by laminated springs of heavy design. The axle boxes are of steel castings, machined to work in the pedestals which are also of steel castings and machined, being riveted to the side frames which are cut out to receive them. The side frames are further strengthened at this point by a doubling plate. The axle boxes are provided with removable fronts, each front of which is fitted with an inspection door. The bearings are of anti-friction metal. The axle boxes are provided with lugs at the bottom, to which the collector shoe-beams are attached. Very ample provision is made for lubrication and the exclusion of dust.

The brake gear is of the inside type, one shoe being provided per wheel. The wheels have centers of wrought iron with nine open spokes forged into them and are fitted with rolled steel tires 5 ins. wide by 3¼ ins. deep, held in place by retaining rings, and also by four set screws.

The motors are carried on the transoms by means of cast-steel brackets riveted thereto in which the nose on the motor rests, being held there by a forged strap. The collector shoe-beams are of oak and bolted to the boxes on each side of each truck, the collector shoes being hung inside the wheel base.

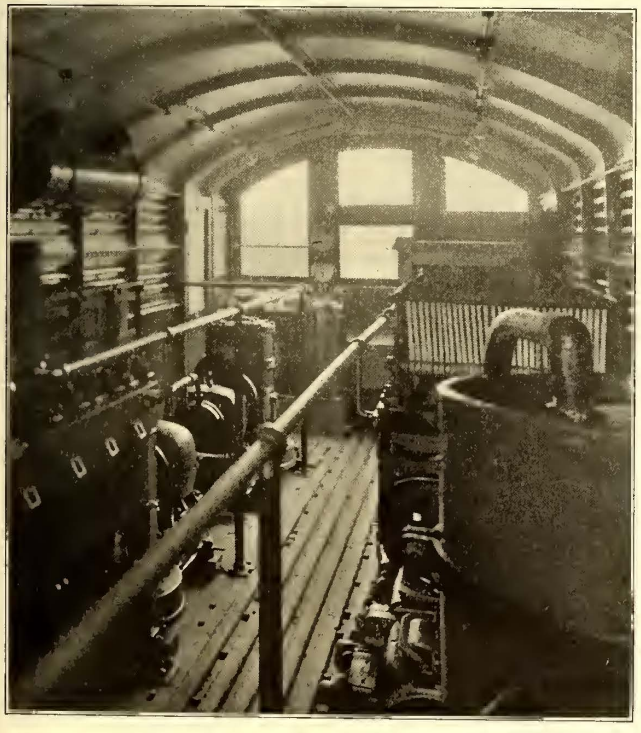
UNDERFRAME

This is constructed of steel members of sufficiently heavy section to bring up the locomotives to the weight desired. Each side sill is formed by a channel 12 ins. x 3 ins. x ½ in. section connected together at the ends by end sills of the same section. The underframe bolster is formed by two channels 10 ins. x 3½ ins. x ½ in. section, and between the two bolsters there are two cross sills of channel section 10 ins. x 3 ins. x ⅜ in. Between end sills, bolsters and cross sills there are two longitudinal channels parallel to one another and of 10 ins. x 3 ins. x ⅜ in. section. To strengthen the ends of the frame against buffing strains still

further, there are two struts, diagonally placed, of channel 10 ins. x 3 ins. x 3/8 in. section. The whole frame is firmly riveted together with steel angles and gussets. The top of this main underframe is covered with steel plate 1/4 in. thick. Above this is a sub-floor 6 ins. deep, formed by channels, in which is laid the whole of the piping containing the wiring, besides the piping for the brakes. On the top of this sub-floor is a floor of steel plates 1/4 in. thiek, made in removable sections. At each end at the driving positions and down the center of the locomotive this floor is covered with wooden walking grids 7/8 in. thiek. At each end of the underframe are plaeed buffers and draw hooks with screw coupling of standard English pattern, besides a central automatic coupler, so that the locomotive can be used for hauling either standard coaches or electric stock.

CAB

The eab, which is of the English box-car shape with eurved roof, is constructed of steel plates 1/8 in. thiek, riveted to supporting vertieal and longitudinal angles, which are in turn riveted to the underframe. The upper portion of the eabs on each side between the doorways are fitted with louvres of pressed steel for ventilation. All lines of rivets are covered with neat metal mouldings so as to improve the appearance of the outside of the eab. At each end of the cab there are four movable windows, three being

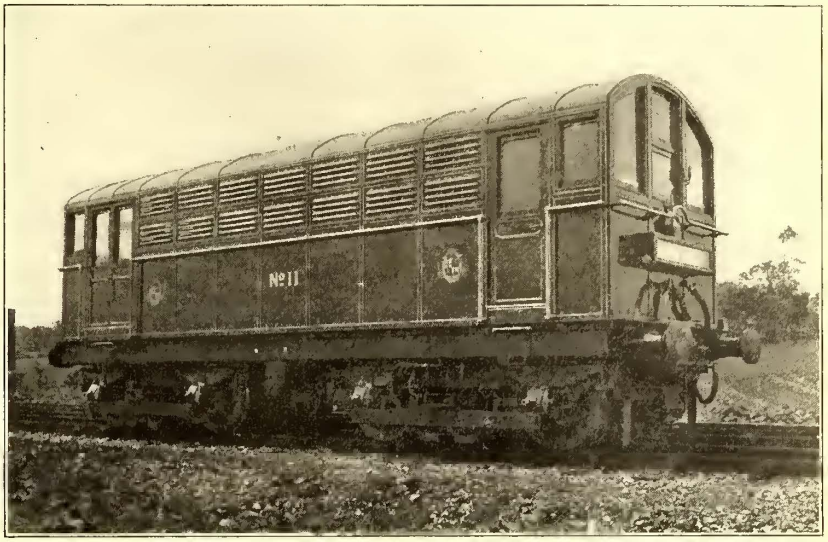


INTERIOR OF LOCOMOTIVE

dropping lights, and one hinging inwards. There is also one dropping light at each side in the corners.

Hinged doors are fitted at each side of the locomotive at the ends, there being two single doors and two double doors. The double doors are for use whenever it is neeessary to remove the exhausters, compressors, etc., from inside the cab. All windows are glazed with 3/16-in. glass, the doors being fitted at the bottom with steel frames.

The locomotive is fitted at each end with complete driving equipment consisting of master controller, provided with "deadman's" handle, air and vaeuum brake, brake valves, starting switehes for fan motors, valves for air-operated whistle and sanding gear, air and vacuum gages and ammeter: also at each end of the cab to the right of the driv-



SIDE VIEW OF LOCOMOTIVE

ing equipment is fitted a column to carry the hand brake gear.

The eontrol and brake equipment is, as far as possible, divided into two sets and placed on either side of the locomotive, leaving a gangway down the center. The control itself is entirely divided into two sets, one set for each two motor equipments.

Taking each side of the loeomotive the arrangement is as follows:

On one side, switchboard containing the necessary main control and cutout switches, compressor motor switch and main lighting switch, control gear consisting of contactors, resistances and cireuit breaker, all mounted on a strong steel frame rigidly connected to the cab sides and underframe. Underneath this is fixed the reverser. The air compressor, main air and vacuum reservoirs being placed in line with the supporting frame.

On the opposite side of the locomotive, looking from the same end are two motor-driven exhaust fans, and the eontrol gear on a framework arranged as above, together with switchboard containing the neeessary control switches, etc., with the addition of the main switches for the fans. The auxiliary reservoir for the air brake is fixed in the eab over the fans.

The air brake is of the quick-acting pattern, air being supplied by a B. T. H. electrically-driven eompressor of the C. P. 23 type. This set will operate against a pressure of 90 lbs. per square inch, and has a cylinder displacement of 50 eu. ft. per minute.

In connection with the vacuum brake there are provided two exhausters each electrieally driven by a B. T. H. type DA motor. One of these exhausters is used for creating the vacuum when starting the train, the other (eontinuously in operation at half speed), for maintaining the vaeuum while running.

In the underframe there are fixed two air-brake cylinders of the vertical type 13 ins. diameter, and two vacuum eylinders 22 ins. diameter. Immediately under the above

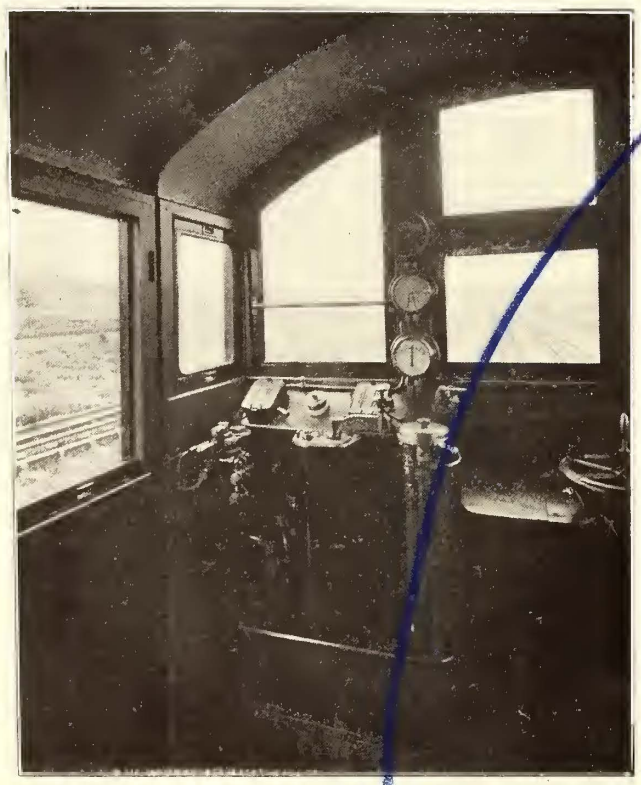
the two transverse rocking shafts to which the pistons of the cylinders are connected, viz: one air and one vacuum to each shaft, each set in turn being connected to the rigging for one truck. It should be noted, however, that the hand-brake wheel at either end of the cab operates the brake rigging on both trucks.

Trip cocks, one for air and one for vacuum, are fitted on each truck.

Power sanding gear is provided, a sand hopper being fitted at each end of the locomotive in the cab, under which is fixed a combined air and sand valve, the sand and air being carried by a flexible pipe to the fixed delivery pipes on the leading end of each bogie.

LIGHTING

Four lighting circuits are provided, one of five lamps placed in the roof down each side of the locomotives, and



MOTORMAN'S CAB

one of five lamps at each end of the locomotive, the distribution of the light in the latter being four lights in the destination indicator and one in the headlight. All the lamps are of 16 cp, and are arranged for working five in series on a 600-volt circuit. Provision is also made at each end of the locomotive for the reception of the necessary oil signal lamps to suit the traffic requirements.

WIRING

All cables are asbestos covered and are run in drawn-steel tubing fitted in the sub-floor wherever possible. The connections between contactors and rheostats are of copper rod. The necessary connection boxes are fitted in the sub-floor and underframe for connecting to the motors and collector shoes.

CAPACITY

Each locomotive when operating on a 600-volt circuit is capable of hauling a 120-ton passenger train on the level at a speed of 35 m. p. h., and of starting with the same load on a grade of 1 in 44, also of hauling a 250-ton goods train up a grade of 1 in 44 and starting with the same load on a grade of 1 in 90.

ELEVENTH ANNUAL MEETING OF GERMAN STREET AND INTERURBAN RAILWAY ASSOCIATION

The eleventh annual meeting of the German Street and Interurban Railway Association (Verein Deutscher Strassenbahn und Kleinbahn-Verwaltungen) was scheduled to be held at Mannheim, Germany, on Sept. 4, 5 and 6. On Wednesday, Sept. 4, Messrs. Stahl and Vellguth were to present a report on the auto-bus and committee B to present suggestions on track specifications and standard rail sections for street and interurban railways. The latest track specifications adopted by the association were published in the Street Railway Journal of Jan. 5, 1907.

On Thursday the association was to discuss means for standardizing the duties and examination of employees of interurban steam railways, and the Prussian State regulations for the public using interurban railways. Committee B also was scheduled to report on corrugation, track crossings and the data on standardization published on page 353 of this issue. It was planned to leave Friday open for the disposition of unfinished business and to entertainment.

STREET AND ELEVATED RAILWAY STATISTICS FOR THE UNITED STATES, CANADA, CUBA AND THE INSULAR POSSESSIONS OF THE UNITED STATES

The accompanying table shows the mileage, number of cars and capitalization of the street, elevated and electric interurban railway companies in the United States and its insular possessions, including Porto Rico, Hawaii and the Philippines; also in Canada (including Newfoundland) and Cuba. The figures are given for the last two years, and are compiled from the last two editions of the Red Book of American Street Railway Investments. The dates of the reports from the different companies as given in the Red Book vary, but practically all of those in the 1907 edition are within the limits of June 30, 1906, and May 1, 1907. The average is believed to be not far from Dec. 30, 1906, so that for this reason the figures given in the table for 1906 may be considered as fairly representing the conditions of the industry at the close of that year.

Where reliable reports could not be obtained of the capital stock and funded debt of the companies, estimates have been made, based upon the known physical property of the separate companies. As the roads not thus reporting were very small, however, both in number and importance, these estimates do not vitally affect the accuracy of the table. More important estimates had to be made of the outstanding stock and funded debt in cases where holding or leased companies owned a portion of the outstanding obligations or capital of sub-operating companies. These estimates were required, as many of the holding companies do not report the proportion of the capitalization of sub-companies controlled by them. In a few cases the inclusion in the 1905 figures of some small steam dummy lines or estimates made in the advance of official figures cause a seeming, but not actual, decrease in the figures of 1906 over those of 1905.

It will be noticed that the cars used in electric railway service in the United States form over 96 per cent of the total number of cars. The greater part of the horse, cable and steam mileage is confined to a few cities, notably, New York, Chicago, Kansas City, San Francisco, Denver, Seattle and Tacoma. The total capital liabilities have increased over 11 per cent during the year in the United States; 64 per cent for the United States insular possessions; 12 per cent for Canada, and 20 per cent for Cuba.

STREET AND ELEVATED RAILWAY MILEAGE, CARS AND CAPITALIZATION IN UNITED STATES AND CANADA.

COMPILED FROM THE STATISTICS OF THE VARIOUS PROPERTIES CONTAINED IN "AMERICAN STREET RAILWAY INVESTMENTS," EDITION OF 1907.

STATES.	No. of Ry. Co.	ELECTRIC RAILWAYS.						CABLE, STEAM AND HORSE RAILWAYS.						TOTAL RAILWAYS.				CAPITAL STOCK.			FUNDED DEBT.			CAPITAL LIABILITIES.			STATES.
		TRACK MILEAGE.		MOTOR CARS.		TRAIL AND SERVICE CARS.		TRACK MILEAGE.		GRIP CARS OR LOCOMOTIVES.		TRAIL CARS OR HORSE CARS.		TRACK MILEAGE.		CARS.		TOTAL.		INCREASE FOR YEAR.	TOTAL.		INCREASE FOR YEAR.	TOTAL.		INCREASE FOR YEAR.	
	1906	1905	1906	1905	1906	1905	1906	1905	1906	1905	1906	1905	1906	1905	1906	1905	1906	1905	1906		1905	1906		1905	1906		
New England States.																											**New England States.**
Maine	19	457	474	473	498	247	275	3	3	....	....	6	6	460	477	726	779	$6,614,713	$8,612,981	$1,998,268	$7,770,500	$9,051,500	$1,281,000	$14,385,213	$17,664,481	$3,279,268	Maine
New Hampshire	18	292	296	348	358	74	78	....	....	....	....	....	....	292	296	422	436	7,077,660	7,207,006	129,346	6,296,000	6,637,000	341,000	13,373,660	13,844,006	470,346	New Hampshire
Vermont	10	121	122	121	122	4	21	....	....	....	2	....	....	121	122	125	145	2,365,600	3,721,510	1,355,910	1,533,000	3,293,000	1,760,000	3,898,600	7,014,510	3,115,910	Vermont
Massachusetts	78	2,778	2,810	7,792	7,853	1,219	2,392	....	8	....	....	25	25	2,778	2,818	9,036	10,270	97,386,000	107,638,100	10,252,100	44,950,000	61,374,000	16,424,000	142,336,000	169,012 100	26,676,100	Massachusetts
Rhode Island	13	445	458	956	972	71	149	....	3	....	2	....	....	445	461	1,027	1,123	17,357,100	21,813,000	4,455,900	20,847,957	20,894,700	46,743	38,205,057	42.707,700	4,502,643	Rhode Island
Connecticut	20	687	774	1,443	1,682	265	293	....	....	....	....	....	....	687	774	1,708	1,975	28,934,240	29,107,500	173,260	22,015,492	48.251,593	26,236,101	50,949,732	77,359,093	26,409,361	Connecticut
TOTAL	158	4,780	4,934	11,133	11,485	1,880	3,208	3	14	....	4	31	31	4,783	4,948	13,044	14,728	159,735,313	178,100,097	18,364,784	103,412,949	149,501,793	46,088,844	263,148,262	327,601,890	64,453,628	TOTAL
Eastern States.																											**Eastern States.**
New York	142	3,304	3,385	12,225	12,198	3,867	3,985	119	163	12	22	516	557	3,423	3,548	16,620	16,762	347,156,970	384,114,356	36,957,386	301,480,926	355,906,083	54,425,157	648,637,896	740,020,439	91,382,543	New York
New Jersey	37	1,123	1,198	2,156	2,200	161	200	6	15	2	3	31	23	1,129	1,213	2,350	2,426	89,697,880	105,348,880	15.651,000	80,925,501	94,714,088	13,788,587	170.623,381	200,062,968	29,439,587	New Jersey
Pennsylvania	145	3,469	3,626	7,981	8,084	1,016	1,086	10	10	3	2	....	4	3,479	3,636	9,000	9,176	236,002,144	237,734,120	1,731,976	174,545,800	175,694,797	1,150,997	410,547,944	413,430,917	2,882,973	Pennsylvania
Delaware	6	146	111	263	200	5	10	....	....	....	....	....	....	146	111	268	210	4,970,000	4,924,040	—45,960	7,084,000	6,474,050	—609,950	12,054,000	11,398,090	—655,910	Delaware
District of Columbia	7	326	326	1,003	1,063	312	316	....	....	....	24	....	....	326	326	1,315	1,403	33,205,000	33,205,000	.....	24,162,100	27,208,439	3,046,339	57,367,100	60,413.439	3,046,339	District of Columbia
Maryland	12	496	538	1,875	1,930	69	173	10	10	6	6	....	....	506	548	1,950	2,109	17,818,000	19,991,400	2,173,400	52,559,000	59,270,000	6,711,000	70,377,000	79,261,400	8,884,400	Maryland
Virginia	25	481	497	633	642	146	180	....	....	....	....	....	1	481	497	779	823	27,473,950	32,407,850	4,933,900	29,856,500	33,078,500	3 222,000	57,330,450	65,486,350	8,155,900	Virginia
West Virginia	15	225	310	335	364	3	31	....	....	....	....	....	...	225	310	338	395	8,453,000	10,775,200	2,322,200	7,904,500	8,232,000	327,500	16,357,500	19,007,200	2,649,700	West Virginia
TOTAL	389	9,570	9,991	26,471	26,681	5,579	5,981	145	198	23	57	547	585	9,715	10,190	32,620	33,304	764,776,944	828,500,846	63,723,902	678,518,327	760,579,957	82,061,630	1,443,295,271	1,589,080,803	145,785,532	TOTAL
Central States.																											**Central States.**
Michigan	41	1,509	1,682	2,052	2,073	236	263	....	....	....	....	....	....	1,509	1,682	2,288	2,336	40,556,000	43,191,000	2,635,000	45,893,000	46,735,500	842,500	86,449,000	89,926,500	3,477,500	Michigan
Ohio	103	3,832	4,495	4,627	4,958	529	778	7	8	....	1	....	14	3,839	4,503	5,156	5,751	184,264,450	208,550,875	24,286,425	115,319,000	120,093,000	4,774,000	299,583,450	328,643,875	29,060,425	Ohio
Indiana	52	1,695	2,008	1,690	1,733	228	266	7	2	3	4	13	42	1,702	2,010	1,934	2,045	55,585,417	70,107,590	14,522,173	52,441,100	59,100,250	6,659,150	108,026,517	129,207,840	21,181,323	Indiana
Kentucky	12	296	337	587	590	285	291	....	2	....	....	....	....	296	339	872	881	17,890,900	20,128,050	2.237,150	11,680,300	13,142,000	1,461,700	29,571,200	33,270,050	3,698,850	Kentucky
Wisconsin	21	543	776	819	821	63	120	....	....	....	....	....	....	543	776	882	941	21,518,300	25,176,200	3,657,900	19,928,000	24,860,000	4,932,000	41,446,300	50,036,200	8,589,900	Wisconsin
Illinois	62	2,293	2,806	4,783	5,595	2,029	1,625	94	24	367	10	1,095	683	2,387	2,830	8,274	7,913	180,654,200	181,960 200	1,306,000	119,072,000	126,095,000	7,023,000	299,726,200	308,055,200	8,329,000	Illinois
Minnesota	7	413	538	844	1,031	366	184	....	....	....	....	....	....	413	538	1,210	1,215	26,453 000	29.955,000	3,502,000	19,554,000	21,071.000	1,517,000	46,007,000	51,026,000	5.019,000	Minnesota
Iowa	29	578	752	794	877	141	178	2	50	5	3	....	40	580	802	940	1,098	17,507,000	31,700,000	14,193,000	11,193,000	15 951,000	4,758,000	28,700,000	47,651,000	18,951,000	Iowa
Missouri	23	1,097	1,129	2,530	2,220	154	438	9	3	56	28	120	200	1,106	1,132	2,860	2,886	77,049,500	85,462,000	8,412,500	90,022,000	97,632,000	7,610,000	167,071,500	183,094,000	16,022,500	Missouri
TOTAL	350	12,256	14 523	18,726	19,898	4,031	4,143	119	89	431	46	1,228	979	12,375	14,612	24,416	25,066	621,478,767	696,230,915	74.752,148	485,102,400	524.679,750	39,577,350	1,106,581,167	1,220,910,665	114,329,498	TOTAL
Southern States.																											**Southern States**
North Carolina	11	94	107	151	168	8	22	....	8	....	....	3	3	94	115	162	193	2,577,100	2,593,500	16,400	2,762,250	3,138,000	375,750	5,339,350	5,731,500	392,150	North Carolina
South Carolina	8	129	133	132	134	16	24	5	5	...	....	10	10	134	138	158	168	2,848.000	3,893,000	1,045,000	5,180,000	5,493.000	313.000	8,028,000	9,386,000	1,358,000	South Carolina
Georgia	13	364	364	469	475	82	88	7	7	....	....	7	13	371	371	558	576	20 229,894	20,904,894	675 000	18,322,000	18,903,500	581,500	38,551,894	39,808,394	1,256,500	Georgia
Florida	12	101	168	111	137	22	40	13	13	....	3	4	11	114	181	137	191	2 666,000	4,271,000	1,605,000	1,958,000	2,304,000	346,000	4,624,000	6,575,000	1,951,000	Florida
Alabama	10	246	263	334	379	128	103	9	11	3	3	10	10	255	274	475	495	10,256,700	11.330,900	1,074,200	12,821,000	13,336,000	1,515,000	22,077,700	24,666,900	2,589,200	Alabama
Mississippi	9	55	79	106	113	7	16	....	....	....	....	....	....	55	79	113	129	2,527,700	3,486,400	958,700	2,533,000	3,119,000	586,000	5,060,700	6,605,400	1,544,700	Mississippi
Tennessee	11	309	337	507	620	127	115	6	....	15	....	....	....	315	337	649	735	14,543,500	18,085,500	3,542.000	11,357,500	19,681,500	8,324,000	25,901,000	37,767,000	11,866,000	Tennessee
Louisiana	9	229	243	701	663	4	54	5	4	....	....	4	4	234	247	709	721	36,856,500	32,805,000	—4,051 500	31,389,000	28,508,000	—2,881,000	68,245,500	61,313.000	—6,932,500	Louisiana
Arkansas	9	100	120	177	180	41	40	....	....	....	....	....	....	100	120	218	220	5,212,900	5,333,400	120,500	3,546,500	4,702,500	1,156,000	8,759,400	10,035,900	1,276,500	Arkansas
TOTAL	92	1,627	1,814	2,688	2,869	435	502	45	48	18	6	38	51	1,672	1,862	3,179	3,428	97,718,294	102,703,594	4,985,300	88,869,250	99,185,500	10,316,250	186,587,544	201,889,094	15,301,550	TOTAL
Western States.																											**Western States.**
North Dakota	2	12	16	32	35	...	5	....	....	....	....	....	....	12	16	32	40	350,000	350,000	.....	300,000	300,000	.....	650,000	650,000	.....	North Dakota
South Dakota	1	39	4	30	3	2	2	....	....	....	....	....	....	39	4	32	5	50,000	50,000	.....	.....	.....	.....	50,000	50,000	.....	South Dakota
Nebraska	9	255	271	357	434	86	50	13	11	....	....	16	12	268	282	459	496	10,592,500	10,832,500	240,000	8,375,000	8,425,000	50,000	18,967,500	19,257,500	290,000	Nebraska
Nevada	1	5	5	5	5	....	....	....	....	....	....	....	....	5	5	5	5	100,000	100,000	.....	300,000	300,000	.....	400,000	400,000	....	Nevada
Kansas	18	182	268	127	186	64	54	10	13	....	....	26	20	192	281	217	260	3,615,000	7,200,000	3,585,000	2,578,000	5,915,000	3,337,000	6,193,000	13,115,000	6,922,000	Kansas
Indian Territory	2	27	34	30	30	....	....	....	..	....	....	....	....	27	34	30	30	600,000	700,000	100,000	608,000	650,000	42,000	1,208,000	1,350,000	142,000	Indian Territory
Oklahoma	7	150	175	43	65	3	22	....	....	....	....	....	....	150	175	46	87	1,500,000	2,300,000	800,000	750,000	1,150,000	400,000	2,250,000	3,450,000	1,200,000	Oklahoma
Texas	24	446	532	663	672	66	80	8	10	....	....	12	20	454	542	741	772	15,966,305	22,507,500	6,541,195	16,277,000	15,892,000	—385,000	32,243,305	38,399,500	6,156,195	Texas
Colorado	13	334	350	386	387	192	238	57	73	15	15	62	66	391	423	655	706	19,312,000	19,369,100	57,100	20,538,000	20,737,000	199,000	39,850,000	40,106,100	256,100	Colorado
Montana	6	74	75	81	107	25	26	....	....	....	....	....	....	74	75	106	133	2.455,613	2,725,613	270,000	1,500,000	1,645,000	145,000	3,955,613	4,370 613	415,000	Montana
New Mexico	2	19	19	12	14	3	3	....	....	....	....	....	....	19	19	15	17	350,000	350,000	.....	350,000	350,000	.....	700,000	700,000	.....	New Mexico
Idaho	4	94	166	15	36	9	9	21	21	2	2	....	70	115	187	26	117	588,400	598,400	10,000	640,000	670,000	30,000	1,228,400	1,268,400	40,000	Idaho
Utah	4	104	160	143	187	7	13	....	8	3	3	....	....	104	168	153	203	10,150,000	7,712,500	—2,437 500	7,293,000	8,840,000	1,547.000	17,443,000	16,552,500	—890,500	Utah
Washington	17	461	715	406	587	269	381	21	21	66	73	....	308	482	736	741	1,349	25,850,400	28,674 310	2,823,910	15,629,000	16,473,000	844,000	41,479,400	45,147,310	3,667,910	Washington
Oregon	11	228	299	307	309	197	198	7	4	4	2	4	4	235	303	512	513	9,035,000	21,830,000	12,795,000	12,345,000	20,156,000	7,811,000	21,380,000	41,986,000	20,606,000	Oregon
California	50	1,840	1,829	1,726	2,194	204	527	174	203	522	499	243	224	2,014	2,032	2,695	3,444	100.003,500	108 513,500	8,510,000	80,886,000	89,819,000	8,933,000	180,889,500	198,332,500	17,443,000	California
Arizona	4	14	32	10	22	7	....	10	6	....	....	10	7	24	38	27	29	337,100	600,000	262,900	100,000	100,000	.....	437,100	700,000	262,900	Arizona
TOTAL	175	4,284	4,945	4,373	5,273	1,134	1,608	321	350	612	594	373	731	4,605	5,320	6,492	8,206	200,855,818	234,413,423	33,557,605	168,469,000	191,422 000	22,953,000	369,324,818	425,835,423	56,510,605	TOTAL
United States	1,164	32,517	36.212	63,391	66,206	13,059	15,442	633	719	1,084	707	2,217	2,377	33,150	36,932	79,751	84,732	1,844,565,136	2,039,948,875	195,383,739	1,524,371,926	1,725,369,000	200,997,074	3,368,937,062	3,765,317,875	396,380,813	United States
Insular Possessions of U. S.—Hawaii, Porto Rico and Philippines	10	87	119	166	2 6	12	30	3	62	....	12	14	137	90	181	192	385	3,391,500	3,871,000	479,500	2,033,000	5,050,000	3,017,000	5,424,500	8,921,000	3,496,500	Insular Possessions of U. S.—Hawaii, Porto Rico and Philippines
Canada, including Newfoundland	48	901	1,073	2,506	2,554	136	280	55	77	5	3	50	83	956	1,150	2,697	2,920	42,935,636	49,423,146	6,487,510	30,906,597	33,732,525	2,825,928	73,842,233	83,155,671	9,313,438	Canada, including Newfoundland
Cuba	3	175	187	195	225	....	460	.. .	....	10	5	....	....	175	187	205	690	18,750,000	22,162,500	3,412,500	14.800,000	18,311,561	3,511,561	33,550,000	40,474,061	6,924.061	Cuba

REPORT OF THE GERMAN STREET AND INTERURBAN RAILWAY ASSOCIATION'S COMMITTEE ON STANDARDIZATION

The subject of the standardization of wheels, axles, journals, brake-shoes and rails, which is now occupying the attention of the American Street & Interurban Railway Engineering Association, is also being actively taken up by committee B (on way and rolling stock) of the Verein Deutscher Strassenbahn und Kleinbahn Verwaltungen. This association corresponds both in name and purpose to the American Street & Interurban Railway Association, and its membership includes the street and interurban railway companies in Germany. The first subject reported upon by the committee was that of rail specifications, and the specifications adopted were published on page 25 of the STREET RAILWAY JOURNAL for Jan. 5, 1907. The report on rolling stock, including trucks, axles, gears, brake-shoes, etc., has recently been prepared and will be considered at the Manheim Convention on Sept. 4-6. It is based on information secured from a data sheet sent to the member-companies on March 1, 1906, and is presented in abstract below:

STATEMENT OF CONDITIONS

The street railway lines in Germany reporting to the committee vary in length from 2.37 and 231 km (1.47 to 143.2 miles); twenty-nine railways are less than 10 km (6.2 miles); twenty-nine are between 10 and 20 km (6.2 and 12.4 miles); twenty-two between 20 and 50 km (12.4 and 31 miles), while the rest are longer. About 10 per cent of the track is on right of way, and the remainder is on city streets or highways where it is subject to use by other vehicles. About 50 per cent of the track operated has no serious grades, 40 per cent grades less than 3 per cent, 7 per cent grades between 3 per cent and 5 per cent, and 3 per cent grades over 5 per cent. Forty-five railways are narrow gage and twenty-five are standard gage. There are also six railways with gages wider than standard. The operating speeds can be grouped into three divisions: city lines, between 6 and 16 km (3.12 and 9.32 miles) an hour; suburban lines, between 11 and 22 km (6.8 and 13.6 miles) an hour, and roads on right of way between 13 and 30 km (8.1 and 18.6 miles) an hour. The average respective speeds under the conditions mentioned are 11.31 km, 14.94 km, and 18.48 km (7.92, 9.34 and 11.5 miles) an hour.

The usual single-track motor cars weigh empty between 6 and 10.5 metric tons (2200 lbs.) each, as shown in the following table:

Railways.	Weight of Car.		
	Total in Metric Tons.	Per Seat (Kg.).	Per Seat (Lbs.).
5	6	206	444
18	7	232	510
28	8	252	554
27	9	260	572
7	10	291	640

It will be seen from the foregoing table that on the average the weight per seat is 250 kg (550 lbs.), and that it increases about 9 per cent for every additional ton in the weight of the car. On single-truck cars weighing between 4 and 8 tons, the average weight per seat is 220 kg (484 lbs.). Ninety-two companies operate single-truck cars exclusively, but fifteen also have double-truck cars. Four of the companies have cars weighing 13 tons, and three have cars weighing 11 and 12 tons empty. In this case the average weight per seat is 293 kg (644 lbs.), or 17 per cent higher than for single-truck cars.

The weight of closed trailers varies between 2 and 6 tons as shown in the following table:

Railways.	Weight of Car.		
	Total in Metric Tons.	Per Seat (Kg.).	Per Seat (Lbs.).
4	2	83	183
24	3	105	231
19	4	120	264
15	5	130	286
11	6	158	348

The average weight per seat in these closed trailers is 124 kg (273 lbs.). Naturally the open trailers are considerably lighter, and their average weight per seat is 93 kg (204 lbs.), or about 25 per cent less than the closed type. Three-ton trailers are used on twenty-one railways, 2-ton cars on thirteen railways, 4-ton cars on eleven railways, and 5-ton cars on eight railways. The weights per seat are respectively 82, 68, 107 and 148 kg (180, 150, 235 and 325 lbs.).

On single-truck motor cars the weight per wheel is between 1.5 and 2.5 tons; on double-truck motor cars, 1.4 to 1.6 tons; on closed trailers, .5 to 1.5 tons, and on open trailers, .5 to 1.5 tons.

As the consumption of power increases with the weight of the car, and the life of the track is influenced largely by the pressure on the wheels, it important to keep the weight of the car down to a minimum. Of course in the case of the motor cars, it is essential that they should be heavy enough to secure proper traction, but much can still be done toward the elimination of unnecessary weight, especially on trailers.

The following averages are given as to the seating capacity of the cars: Single-truck motor cars, 30; double-truck motor cars, 42; single-truck trailers, 32; double-truck trailers, 50. The distance covered by a motor car naturally depends largely on the reserve rolling stock, but the following figures may be of interest. The minimum service per car owned is stated to be 24,000 car-km (14,880 car-miles) per annum, the maximum is 62,800 car-km (38,936 car-miles), and the average 36,000 car-km (22,320 car-miles), which corresponds to about 100 km (62 miles) a day.

AXLES

The section of the report devoted to axles and journal bearings states that the diameter of axles of single-truck cars varies from 80 to 120 mm (3.15 to 4.72 ins.), and reaches 130 mm (5.12 ins.) on double-truck cars. Two railways use axles of 80 mm (3.15 ins.) diameter, nine of 90 mm (3.54 ins.), nine of 95 mm (3.73 ins.), twenty-eight of 100 mm (3.93 ins.), twenty-four of 105 mm (4.13 ins.), forty-one of 110 mm (4.33 ins.), one of 115 mm (4.53 ins.), and four of 120 mm (4.72 ins.). From the foregoing it will be seen that the most common axle diameter is 110 mm (4.33 ins.), and it is worth noting that eight of the operating railways will adopt this diameter in place of smaller axles now used. Railways having many steam railroad crossings do not consider an axle of 110 mm (4.33 ins.) diameter strong enough, and prefer one of 120 mm (4.72 ins.).

The diameter of journals varies from 70 to 100 mm (2.76 to 3.94 ins.). Seventeen railways have journals of 70 mm (2.76 ins.) diameter, fifteen of 75 mm (2.96 ins.), forty-nine of 80 mm (3.15 ins.), two of 85 mm (3.34 ins.), thirteen of 90 mm (3.54 ins.), one of 95 mm (3.73 ins.), and one of 100 mm (3.93 ins.). It will be seen from this that forty-

nine companies consider 80 mm (3.15 ins.) diameter satisfactory. The length of the journal also shows great differences, the length varying from 120 to 280 mm (4.72 to 11 ins.). Twenty-three railways have journals 120 mm to 150 mm (4.72 to 5.89 ins.), two of 160 mm (6.29 ins.), five of 170 mm (6.68 ins.), fifteen of 180 mm (7.08 ins.), two of 190 mm (7.47 ins.), six of 200 mm (7.86 ins.), twenty of 210 mm (8.25 ins.), ten of 220 mm (8. 64 ins.), and nineteen of 230 mm to 280 mm (9.04 to 11 ins.).

The following are recommended as standards to replace the varieties of axles and journals given in the foregoing figures:

Axle Diameter.		Journal Diameter.		Journal Length.	
Mm.	Inches.	Mm.	Inches.	Mm.	Inches.
100	3.93	75	2 96	150	5.89
105	4.13	80	3 15	180	7.08
110	4 33	80	3.15	210	8.25
120	4.72	90	3 54	250	9.84

The journal pressure allowed by most of the railways is given as 20 kg per square cm (285 lbs. per sq. in.).

One of the questions asked was on axle breakage. The companies were requested to give the number of axle breakages in 1903, 1904 and 1905. In 1903 twenty-four railways had 285 breakages; in 1904 thirty-five railways had 324 breakages, and in 1905 forty-one railways had 380 breakages. Relatively, these troubles have decreased, owing to the use of better material and improved methods of mounting the gears. The accidents on fifteen railways are ascribed to weak axles, on seven to crossings with steam railroads, on four to inferior material, while eleven railways think the trouble was caused either by excessive speed over switches or improper construction of the key-way. Five railways had no reasons to offer. The principal material used for the axles is Siemens-Martin steel, but recently six railways have adopted nickel steel. The latest orders placed by twelve companies call for Siemens-Martin steel with a tensile strength of 50 kg to 70 kg per sq. mm (71,115 to 99,561 lbs. per sq. in.), 18 to 20 per cent expansion, and 30 to 40 per cent contraction. Seven railways demand nickel steel having 60 kg to 80 kg per sq. mm (85,338 to 113,784 lbs. per sq. in.), 15 per cent expansion and 45 per cent contraction. Two railways consider "excelsior" steel to be the best for their conditions.

On the whole it is believed that for normal operation the Siemens-Martin steel with a tensile stress of 50 kg to 60 kg per sq. mm (71,115 to 85,338 lbs. per sq. in.) 18 to 22 per cent expansion and 35 to 40 per cent contraction will be satisfactory, but the cross-sections of the axle must not be weakened at the wheel fit or key-way; on the contrary, the axles should be thicker at these points.

JOURNAL BOXES

Seventy-four railways use the ordinary journal boxes, some with fixed and others with loose bearings, but twenty-one railways are using, to some extent, the Corbuly journal box. All railways find the usual box satisfactory on the whole. Of those using the special type mentioned, two have found it unsatisfactory, but the others consider it all right. Lubrication is with either cotton or wool waste, and only five railways use other material.

It is very difficult to come to any definite decision on the question of ball bearings. Only five railways have experimented with them and all finally rejected them, due either to little or no saving in current or excessive cost of maintenance. Roller bearings are being tried by eight railways. On four of these lines good results are reported, on one the bearings broke, and on the other three the experiments are still in progress.

TRUCKS

The wheel base on motor cars varies from 1.4 m to 33.2 m (4.6 ft. to 10.5 ft.), but the latter dimension occurs only on one railway which has no curves under 50 m (164 ft. radius). Of the railways reporting, thirty-four have a wheel base of 1.8 m (5.9 ft.), twenty-five of 1.7 m (5.57 ft.), fourteen of 1.6 m (5.25 ft.), twelve of 1.5 m (4.92 ft.), nine of 2. m (6.56 ft.), one of 2.3 m (7.54 ft.), three of 2.5 m (8.2 ft.), and one of 2.8 m (9.18 ft.). The wheel base of trailers varies between 1.2 to 3,2 m (3.91 to 10.5 ft.). The largest number of railways (twenty-four) use a wheel base for trailers of 1.8 m (5.9 ft.), nineteen of 1.6 m (5.25 ft.), and fifteen of 1.7 m (5.57 ft.). Wheel bases for trailers greater than those mentioned are employed in some cases, and seven railways use wheel bases up to 2.5 m (8.2 ft.).

CURVES

It was considered desirable to learn the radii of curves on the reporting lines, particularly the minimum radii, to determine the relation between the radii of curves and the wheel bases of trucks. On most of the railways the radii range from 10 m to 150 m (32.8 to 492 ft.). Only two lines report a radius of 10 m (32.8 ft.) and of 11 m (36.1 ft.), respectively, while three report 12 m (39.36 ft.), one 12.5 m (41 ft.), four 13 m (424.6 ft.), three 13.5 m (44.3 ft.), two 14 m (46 ft.), and two 14.5 m (47.6 ft.), twenty-six railways report 15 m (49.2 ft.) as the smallest radius. Further, there are fifteen lines with 20 m (65.6 ft.) radius, and only one line each with 40 m to 50 m (131.2 to 164 ft.), and 75 m and 150 m (246 ft. and 492 ft.), respectively. The others run between 15 m and 20 m (49.2 ft. and 65.6 ft.). The question as to the sharpest curve that can be used by a maximum rigid wheel base is answered as follows:

Radius in		Wheel Base in		To What Extent can the Wheel Base be Increased on the Same Curve.
M.	Feet.	M.	Feet.	
13.5	44.3	1.6	5.25	Not at all.
12.	39.36	1.8	5.9	Not at all.
18.	59.	2.48	8.2	Not at all.
15.	49.2	2.	6.56	Not at all.
13.5	44.3	1.8	5.9	Not at all.
18.	59.	2.	6.56	Not at all.
15.	49.2	2.	6.56	Not at all.
15.	49.2	1.7	5 58	Not at all.
12.	39.36	1.7	5.58	To 1.90 m., 6.2 feet.
16.	52.5	2.8	9.18	Not at all.
12.5	41.	1.55	5.1	To 1.70 m., 5.58 feet.
15.	49.2	2.4	7.87	To 2.2 m., 7.22 feet.
15.	49.2	2.5	8.2	Not at all.

From this it will be seen that for 12.5 m (41 ft.) radius, the maximum practicable wheel base is 1.55 m (5.1 ft.), for 13 m (42.6 ft.) radius, 1.6 m (5.25 ft.), from 13.5 m to 15 m (44.3 to 49.2 ft.) 1.8 m, from 16 m to 18 m (52 to 59) radius 2 m (6.56 ft.).

RADIAL TRUCKS

It is impossible to give any definite decision regarding radial truck. Eleven companies have installed such trucks under motor cars, and eight are satisfied with the result. Eleven companies use radial trucks under trailers. The reports in both cases are given in the following tables:

Radial Truck.		Motor Cars.		Opinion
Minimum Radius in		Wheel Base in		
M.	Feet.	M.	Feet.	
20.	65.6	2.8 to 3	9.2 to 9.84	Good.
19.	62.	2.	6.56	Cars swing heavily on curves.
18.	59.	1.8	5.9	Good.
17.	55.8	2.5	8.2	Good.
16.	52.5	2.	6.56	Less quite than rigid axles.
15.	49.2	2.	6.56	Good.
12.5	41.	2.8	9.18	Good.
11.	36.1	2.8	9.18	Nothing special

Radial Truck.		Trail Cars.		Opinion.
Minimum Radius in		Wheel Base in		
M.	Feet.	M.	Feet.	
50	164.	3.5	11.48	In general good results were achieved.
20	65.6	3 to 3.2	9.84 to 10.5	
19	62.	2.	6.56	
18	59.	2.48	8.2	
17	55.8	2.5	8.2	
16	52.5	2.8	9.18	
15	49.2	2.5 to 3	8.2 to 9.84	

On comparing the figures given for radial and rigid trucks it will be seen that with the former it is possible to operate on much sharper curves and that according to eight railways the use of radial axles is more advantageous on the whole.

SINGLE-AXLE RUNNING GEAR

Experiments were made by nine railways with this running gear. Six railways were supplied by the Nürnburger Maschinen-Bauanstalt, and the others by Hermann Böcker and the Herbrand Company. On four of these lines the experiments have not yet been concluded, four others express satisfaction, and only one complains about the insufficient braking resulting with this system.

This type of running gear doubtless has many advantages as the wheel base can be greatly increased, but where the hand brake only is used, too much strain is placed upon the braking levers. Another disadvantage as compared with rigid axle trucks is that the car weight is greatly increased. The system probably is advantageous only for cars with more than twenty seats, and where the ordinary double trucks are not desirable on account of heavy grades.

TRUCK SPRINGS

Double spring suspension is used on practically all of the motor cars; seventy-two companies use this form, and only eighteen confining themselves to single springs. For trail cars, however, double springs have not been widely adopted. Fifty-six railways are still using single springs for their trailers. It is recommended that double springs should be used on all rolling stock. Recently elliptic springs have been given the preference over spiral springs. The failures of springs are usually due to defective material as apparent from the reports of railways, on some of which no breakages occur, while on others they are very frequent.

GEARING

The life of gear wheels is extraordinarily variable and ranges from 10,000 km to 300,000 km (6200 miles to 186,000 miles) for the gears, and 10,000 km (6200 miles) for pinions. It may be of interest to give the various modules of pitch used. Twenty-two railways use a module of 6.5 mm (.255 in.), thirty-eight of 8 mm to 8.5 mm (.31 in. to .33 in.), eleven of 9 mm to 10 mm (.354 in. to .393 in.), and only two have a module of less than 6 mm (.236 in.). It will be seen therefore, that the largest number of systems use a module of 8.5 (.33 in.), which is probably the right one for railways with unfavorable grade and track conditions. However, a smaller module could be used for city railways where the operating conditions are not so unfavorable. It has also been found that a shorter tooth has resulted in a considerable reduction of noise, hence it is recommended that under favorable conditions a module of 6 to 7 be used instead of 8.5. In general the life of the pinion is about one-third that of the gear.

The usual gear ratio varies from 1:3.5 to 1:5.6, and none of the companies is thinking of changing the ratios it has in use. Involute teeth are used by sixty-five railways, and cycloid teeth by twenty-five railways. Naturally the increasing work put upon the gearing by the use of heavier cars and short-circuiting brakes demanded the adoption of better material. It is some time since cast-iron gears were replaced by cast steel, and the former material is now used by only one company. Siemens-Martin steel is generally used for pinions, but five railways are using mild steel also. Case hardening of the pinions has been employed with such success that their life has been doubled, and even tripled. Thirty-six railways are favorably disposed toward this process, but fourteen complain that it results in a greater and unequal wear of the gears.

The life of the gearing may be noted from the following table:

Life of Gears in		Number of Railways.	Life of Pinions in		Number of Railways.
1000 Km.	1000 Miles.		1000 Km.	1000 Miles.	
1- 10	.62- 6.2	3	1- 10	.62- 6.2	13
10- 20	6.2 - 12.4	2	10- 20	6.2 -12.4	14
20- 30	12.4 - 18.6	2	20- 30	12.4 -18.6	11
30- 40	18.6 - 24.8	6	30- 40	18.6 -24.8	7
40- 50	24.8 - 31.	3	40- 50	24.8 -31.	5
50- 60	31. - 37.2	2	50- 60	31. -37.2	6
60- 70	37.2 - 43.4	5	60- 70	37.2 -43.4	3
70- 80	43.4 - 49.6	3	70- 80	43.4 -49.6	3
80- 90	49.6 - 55.8	5	80- 90	49.6 -55.8	1
90-100	55.8 - 62.	2	90-100	55.8 -62.	3
100-110	62. - 68.2	1	Over 100	Over 62.	7
110-120	68.2 - 74.4	3			
120-130	74.4 - 80.6	1			
130-140	80.6 - 86.8	3			
140-150	86.8 - 93.	8			
150-200	93. -124.	5			
200-300	124. -186.	5			
Over 300	Over 186.	2			

It is surprising to learn from the foregoing table that the life of the gearing is so short on many lines, and it would seem that this important point does not receive the attention it deserves. Aside from the material and the even wear of the gear and pinion, the length of the armature bearings and the condition in which they are kept must also exercise considerable influence on the gear life. It may be asserted with confidence that the armature bearing on the gear wheel side should not be less than 120 mm (4.72 ins.) in length, and better still, as much as 150 mm (5.89 ins.), while the motor bearings should not be less than 220 mm (8.66 ins.) and, if possible, 250 mm (9.84 ins.). The great wear of most of the gear wheels reported is ascribed to the causes mentioned, and also to the fact that many railways do not use the same quality of material constantly so that they rarely receive exactly the same shapes even though one model is followed. Some systems have found that the life of the gears can be lengthened by recutting the teeth on the gear where the rims are of sufficient depth.

Fifteen railways have been using gear wheels with inter-

changeable rims, but the experiments with them are not looked upon as conclusive. It is believed, however, that this type of gear may find a wider field if the first cost and renewal cost can be reduced. The general impression is that the manufacturer places too great a value on his patent.

MOTOR LUBRICATION

Although lubrication by oil is recognized as superior to grease, most of the railways are still using the latter, as the old motor bearings are not adapted for oil. The conditions in this respect are shown in the following table giving number of companies:

	Grease.	Oil.	Oil and Grease.
Motor bearings	51	18	26
Armature bearings	48	26	21
Journal bearings	8	87	
Gearing	85	10	

MOTOR BEARINGS

The next table gives a résumé of the life of motor and armature bearings, and from this will be seen the close connection between the life of the bearings and the wear of the gearing. In general the life of motor bearings varies between 10,000 and 140,000 km (6200 and 86,800 miles), and of the armature bearings between 1000 and 50,000 km (620 and 31,000 miles).

Life of Motor Bearings in		Number of Railways.	Life of Armature Bearings in		Number of Railways.
1000 Km.	1000 Miles.		1000 Km.	1000 Miles.	
20– 30	12.4–18.6	22	1– 5	.62– 3.1	8
30– 40	18.6–24.8	6	5–10	3.1 – 6.2	15
40– 50	24.8–31.	7	10–20	6.2 –12 4	24
50– 60	31. –37.2	4	20–30	12.4 –18.6	19
60– 70	37.2–43.4	3	30–40	18.6 –24.8	9
70– 80	43.4–49.6	1	40–50	24.8 –31.	5
80– 90	49.6–55.8	2			
90–100	55.8–62.	4			
100–140	62. –86.8	4			

BRAKE-SHOES

The reports on brake-shoes show that gray iron is used on eighty-two railways, cast steel on five railways, an equal mixture of steel and gray iron on two railways, and chilled iron on only one railway. Three systems are using a patent mixture, but do not give results. One company reports that it uses wood and another a combination of gray iron and cast iron with a different amount of combined carbon. Two railways prefer hard, instead of soft, gray iron. Sixty-eight lines are using combined brake-shoes and heads, and twenty-seven employ shoes with interchangeable brake heads. The latter arrangement appears preferable. The life of brake-shoes varies between 400 and 16,000 km (248 and 9920 miles), as shown in the table herewith.

Wear of Brake Shoes.		Number of Railways.
Km.	Miles.	
400– 2000	248–1240	19
2000– 4000	1240–2480	21
4000– 6000	2480–3720	11
6000– 8000	3720–4960	9
8000–10000	4960–6200	6
10000–12000	6200–7440	4
12000–14000	7440–8680	3
14000–16000	8680–9920	4

VIENNA TRAMWAY FIGURES

The management of the Vienna municipal street railway system has just published its annual report for 1906 in a volume comprising eighty-four pages with full details of every department. Included are two maps, one in colors showing the track plan of the system and the other a bird's-eye view of Vienna. From the report it appears that the management is to give an auto-bus service to a suburban point called Kaiser-Ebersdorf as soon as the vehicles arrive. Plans are under way also for transportation of beer from the municipal brewery at Rennersdorf to distributing centers in Vienna.

The system includes 189 km. (117.2 miles) of route and 397 km. (246.1 miles) of track. Part of the system in the center of Vienna, amounting to 29.8 km. (18.5 miles), is of the conduit type. During the year the management constructed 35 km. (21.7 miles) of new track. Of this about 21 km. (13 miles) were furnished with Melaun mitred joints, 9 km. (5.4 miles) with Scheinig & Hoffman bridge joints and the rest angle-plate joints. A considerable portion of the old joints were repaired according to the Melaun method.

White tin tablets bearing instructions to throw the electric brake in circuit have been posted at the tops of all grades of 4 per cent and over to decrease accidents.

The total number of cars was 3928; the average weight per car increased from 12.4 tons to 12.8 tons; the seating capacity from 38.1 to 39.4 and the standing room from 30.3 to 32.

The total number of employees on the Vienna municipal system is 6857. As on many other Continental railway systems, a great deal of attention is given to employees' pensions, as well as sick and death benefits. The time served by the employees of the old private companies is counted toward the retirement period whether or not any money was paid by such individuals into the pension fund during their former period of employment. If anyone has been a member of the pension fund for ten years and is discharged for no fault of his own he is entitled to partake of the benefits as though he had been retired for old age. The office employees are also pensioned. The minimum annual pension for widows has been increased from 400 K ($97) to 800 K ($194), and the maximum pension from 1,800 K ($436.50) to 2,700 K ($654.75).

All apprentices and mechanics in the shops receive a daily bonus of .6 K (14.5 cents) to .8 K (19.4 cents) for night work, and the night employees of the overhead system a bonus of from 1 K (24.25 cents) to 1.6 K (38.75 cents). The instructors in the employees school receive 2 K (48.5 cents) extra a day, and for instructing men in practical operation the conductors and motormen receive 6 K (14.5 cents) additional. The student employees receive 2 K (48.5 cents) a day while learning.

During the year the salaries of petty officers, such as inspectors, were increased 35 to 40 per cent and the schedule arranged so all would have one day off in every seven instead of one-half day as heretofore. The period during which officers of the company receive full salary in case of illness was increased from six months to one year, and for petty officers from two months to four months. All persons who are members of the pension association receive sickness expenses up to 75 per cent of their usual wages from the fifteenth day of their illness and continuing sixty days if necessary. Employees obliged to attend army

manoeuvers received 21,818 K ($5,290.86) in 1906, and 21,761 K ($5,277.04) for other leaves of absence. In premiums 29,060 K ($7,047.05) was given to motormen, 1,896 K ($459.78) to conductors, and 695 K ($168.54) to other employees. For welfare work 1,052,845 K ($255,215) was spent.

The pension institute had 108 men and 128 women. The sick benefit fund averaged a membership of 6472 during the year, or practically all of the regular employees. During the year 51,632 K ($12,520) was paid for employees' accident insurance.

Key numbers and letters are now used instead of the usual car destination signs and are illuminated at night. The schedule speed of the cars has been increased from 10.3 km. (6.4 miles) to 11.8 km. (7.4 miles) an hour, or about 13 per cent. Owing to the greater strain thus put upon the motormen, the number of hours of actual service for them was reduced on most of the lines, and hence the decrease in wages has not been in proportion to the increase in speed. During the year 58,578,379 car-km. (36,315,595 car-miles) were operated, an increase of 11.4 per cent over the preceding year. The increase in motor car-km. operated was 3.5 per cent, and of trailers 25.9 per cent. In all 199,436,291 passengers were carried, making an increase of 9.7 per cent over the preceding year, as compared with 11.4 per cent increase in mileage. During the same year the Vienna City Railway carried 31,147,771, the United Omnibus Company 13,872,118, and the Vienna steam tramways 3,856,381 passengers. The average number of passenger per car-km. was 3.4 (5.4 passengers per car-mile). The receipts from passengers were 28,454,577 K ($6,900,235) or an increase of 9.6 per cent, which is practically the same as the increase in passengers already noted. The average receipts was 48.6 heller per car-km. (19.4 cents per car-mile). The average receipts per passenger was 14.41 heller (3.5 cents). During the year there were 1261 accidents involving personal injuries; 1178 were slight, 83 severe, and 20 fatal. The majority of these accidents was due to passengers jumping on and off cars in motion, resulting in the death of three, and twenty-two severely injured. There were 340 accidents due to crossing tracks. The increase in accidents over the preceding year was between 20 and 25 per cent, and is ascribed partly to the increase in speed, but mainly to the exceptionally bad weather during the year. A large number of cars is equipped with wheel guards, and others are now being furnished with basket-type fenders.

The total income from passengers was 28,454,577 K ($6,900,235), against 25,970,941 K ($6,297,953) in 1905. The operating expense per car-km., excluding the amounts paid for the different branches of welfare work, was 28.3 heller (11.3 cents per car-mile) in 1906, and 29.8 heller (11.9 cents) in 1905. The total operating expenses in 1906 were 59.3 per cent of the income, and 60.3 per cent in 1905, but adding the welfare expenses these figures rise to 63 per cent and 63.1 per cent respectively.

The United Railroads of San Francisco has started the work of placing its feed wires underground, an improvement that will extend to the entire system as soon as the condition of the streets will permit. The underground conduits are laid along a portion of Mission Street, and are now being installed along the east end of Market Street, the part that is being regraded. A trench is excavated along the south track, outside the rails, and the conduit laid in concrete is inserted. A manhole is placed on every block.

HIGH-VOLTAGE DIRECT-CURRENT AND ALTERNATING-CURRENT SYSTEMS FOR INTERURBAN RAILWAYS*

BY W. J. DAVIS, JR.

The magnitude and direction of engineering development in apparatus for the electrical equipment of high-speed interurban railways is well illustrated by a study of the systems adopted by some of the more important lines recently built or now under construction. These systems may be divided into three classes, namely:

1. 600-volt direct current using either overhead trolley or third rail.

2. 1200-volt direct current, overhead trolley.

3. Single-phase alternating current, 3300- or 6600-volt overhead trolley.

As apparatus for the operation of the 1200-volt direct-current system is being manufactured in this country only by one company, the list of roads given below comprises only those using this kind of equipment, and is limited to sales to new roads made during the past year.

The largest installation undertaken during the past year was that of the West Jersey & Seashore Railroad, comprising equipment for 145 miles of single track and 35,600 hp in railway motors. On account of the limited time required for the completion of this installation (six months from date of selecting power house site) it was impossible to furnish apparatus of special type, making the selection of the 600-volt direct-current system obligatory. For this reason the equipment of this road is not included in the following statistics.

	Length of Track.	No. of Cars.	Size Motors.	Total Motor H.P
600 VOLTS DIRECT CURRENT				
Texas Traction Co.	63 miles	15	4 x 75 hp.	4,500
Elmira, Corning & Waverly	15 "	7	4 x 60 "	1,680
Buffalo, Lockport & Rochester	70 "	19	4 x 75 "	5,700
Oregon Railway	40 "	8	4 x 75 "	2,400
	188 miles	49		14,280
1200 VOLTS DIRECT CURRENT				
Central California Traction Co.	16 miles	6	4 x 75 hp.	1,800
Pittsburg, Harmony, New Castle & Butler	63 "	12	4 x 75 "	3,600
Indianapolis & Louisville	41 "	10	4 x 75 "	3,000
Indianapolis, Columbus & Southern	..	3	4 x 75 "	900
San Jose & Santa Clara	9 "	8	4 x 75 "	2,400
	129 miles	39		11,700
SINGLE-PHASE 3300 OR 6600 VOLTS				
Washington, Baltimore & Annapolis	52 miles	25	4 x 125 hp. / 2 x 125 "	11,500
Central Illinois Construction Co.	40 "	10	4 x 75 "	3,000
Anderson (S. C.) Railway	35 "	3	4 x 75 "	900
Richmond & Chesapeake Bay	15 "	4	4 x 125 "	2,000
	142 miles	42		17,400

Total horse power in motors sold, 43,380 of which
600 volt direct current has 33 per cent.
1200 volt direct current has 27 per cent.
Single-phase alternating current has 40 per cent.

It is most interesting to note that two-thirds of the total motor capacity sold consists of 1200-volt direct-current and single-phase alternating-current motors, indicating the eagerness of electric railway builders to take advantage of the reduced cost of construction and equipment, and economies in operation resulting from the use of higher secondary distributing voltages. The magnitude of the possible savings will depend upon the local and service conditions and will vary over a wide range.

Generally speaking, increased voltage at the trolley will be attended with reduction in cost of copper and sub-station apparatus, and by increased cost of car equipments due

* Paper presented at a meeting of the Chicago section of the American Institute of Electrical Engineers, March 26, 1907. For a report of the discussion on this paper, see page 950 of the STREET RAILWAY JOURNAL for June 1.

to the inherently heavier and more expensive character of the motors and control systems. Where the car movement is especially frequent, as in case of rapid transit suburban service in the vicinity of the larger cities, requiring from two to four tracks, the 600-volt direct-current systems will generally prove the cheaper, a result largely due to the lower cost of the motors.

On account of the variable character of the conditions encountered, each problem requires a special investigation before the relative merits of the three systems can be reliably determined, but the following general limitations will be found to hold true.

1. Street railways and elevated roads in cities should unquestionably be equipped with standard 600-volt direct-current apparatus.

2. Suburban lines 10 to 15 miles in length operating cars on frequent headway should be equipped with 600-volt direct-current system.

3. For high-speed interurban railways operating cars 50 ft. or more over all at speeds of 40 m. p. h. or more:

a. The 600-volt direct-current system is the most reliable on account of being most fully developed.

b. The 1200-volt direct-current system is somewhat cheaper in cost than the 600-volt system, but is as yet an untried system.

c. The single-phase alternating-current system will in most cases show material saving in cost over the direct-current systems, and has been developed to a point where it may be considered commercially successful and capable of giving satisfaction in operation, if properly proportioned for the service to be performed.

There are certain conditions which render the alternating-current motor system unduly expensive or impracticable, namely, the enforced use of a frequency greater than 30 cycles, the presence of grades greater than 8 per cent or the necessity of obtaining perfectly balanced three-phase load under all conditions. In such cases, the 1200-volt or the 600-volt direct-current system will prove the most economical, preference being given to the latter, although the cost of installation will be greater.

The single-phase alternating-current and 1200-volt direct-current equipments may both be made to operate satisfactorily on standard 600-volt direct-current systems, and assuming equal reliability, the question becomes one of first cost and economy in operation. The following table will show approximately the relative cost of a typical suburban road with the several systems.

Comparative Cost Per Mile, Single Track.

	Direct Current 600 Volts.	Direct Current 1200 Volts.	Alternating Current 6600 Volts.
Road bed complete, including grading, ballasting, etc	$15,000	$15,000	$15,000
Trolley and feeder installed	3,800	3,000	2,100
Track bonding	600	530	480
Transmission line, installed	1,500	1,500	1,300
Sub-stations, installed	2,200	1,600	600
Power station, installed	2,450	2,450	2,570
Cars and equipment	1,800	1,970	2,300
Telephone	120	120	120
Total	$27,470	$26,170	$24,470
Saving over 600 volts, direct current	.....	1,300	3,000

It is of interest to compare the operating economy of the three systems, eliminating those items which are of equal value in each. The comparison given below is based on coal at $3 per ton; coal consumption, 3.5 lbs. per kw-hour; sub-station attendance, $1,750 per annum; maintenance of car equipments, 0.4 cent per car-mile for 600-volt direct current; 0.5 cent for 1200-volt direct current, and 0.6 cent for alternating current, and fixed charges at 10.5 per cent.

Relative Operating Cost Per Mile Single Track Per Annum

Per Mile of Track, One-Hour Headway.	Direct Current 600 Volts.	Direct Current 1200 Volts.	Alternating Current 6600 Volts.
Car-miles per day	64	64	64
Kilowatt-hours per day at power-house	275	275	245
Cost of coal per annum	470	470	419
Cost of sub-station attendance	175	79	46
Maintenance of motors and control	94	117	140
Total	$739	$366	$605
Saving over 600 volts direct current exclusive of fixed charges	....	73	134
Saving in fixed charges	....	137	315
Total annual saving	....	$210	$449

Another method of comparison is to capitalize the annual saving exclusive of fixed charges. Assuming fifteen years as the average life of equipment and construction work, the present value of the annual saving in operating expenses per mile of track at 5 per cent interest will be:

For the 1200-volt direct-current system	$756
To which add saving in first cost	1,300
Making the total capital value of	$2,056 = 7.5%
And for the 6600-volt single-phase system	$1,390
To which add saving in first cost	3,000
Making the total capital value of	$4,390 = 16%

The above comparison is based on service and construction conditions applying to the typical high-speed interurban electric railway, the fundamental assumptions and principal data being as follows:

Length of road, 50 miles or more.

Cars 52 ft. over all, weighing 21 tons without equipment or load, and seating fifty-six passengers.

Car equipment, four 75-hp motors.

Maximum speed on tangent level track, 45 m. p. h.

Schedule speed 24 m. p. h., including stops and slow running through towns.

Headway, maximum service, 0.5 hour.

Frequency of stops, one in 2 miles, interurban.

Average car energy, 85 watt-hours per ton-mile at car.

	Direct Current 600 Volts.	Direct Current 1200 Volts.	Alternating Current 6600 Volts.
Cost of cars equipped	$10,800	$11,800	$13,800
Spacing of sub-stations	10 miles	22 miles	32 miles
Maximum voltage drop, trolley line	25%	25%	10%
Efficiency of system, generator bus-bars to cars	71%	71%	84%
Average efficiency of car equipment	75%	75%	73%
Average power-factor of system	96%	96%	85%

As the 1200-volt direct-current system is still in process of development, a brief description may prove of interest.

The roads which are now being equipped may be divided into three classes: 1. Those which are required to operate on 600-volt direct current at full maximum speed as on the 1200-volt sections; 2, those which are required to operate on 600-volt direct current, but at approximately half maximum speed; and 3, those which operate only on 1200-volt trolley.

The first class requires motors wound for 600-volts, but designed to stand 1200 volts without danger of flashing or injury to the insulation. The motors are connected in four-multiple when run on 600 volts and in two parallel groups of two motors in series when run on the 1200-volt sections.

In the second and third classes the motors may be wound for either 600 or 1200 volts, preference being given to the latter on account of improvement in tractive power at slipping point of the wheels. In order to obtain satisfactory commutation qualities and to prevent tendency to flashing

at the commutator at the high voltages encountered, all motors for the 1200-volt system are provided with a compensating winding in the shape of series-wound auxiliary poles located midway between the magnetizing poles, and so proportioned as to neutralize the armature reaction under all loads. The additional insulation required causes the motors to weigh 15 per cent to 20 per cent more for a given output than 600-volt motors. This additional weight is not due to the inter-pole construction, as on the basis of equal voltages the inter-pole motor will weigh about the same or a little less than the standard railway motor.

The control system is substantially the same as that used on the 600-volt system, with the exception of some slight changes in the insulation of the primary circuits. The secondary circuits are all energized at 600 volts, as are also the car heaters and lights, and for this purpose a small dynamotor is furnished for use when run on 1200 volts, the function being to change the voltage to 600. The capacity of this dynamotor as furnished with quadruple 75-hp equipment is 38 amps., which provides for the lighting, heating, and air-pump circuits for one car, and secondary control-circuit for a train of six cars.

NEW TYPES OF OIL SWITCHES AND CIRCUIT-BREAKERS

The development of the oil switch and circuit breaker has produced what is probably the most valuable addition to high-potential line apparatus made during the last ten years. It is indeed likely that the development of high-tension transmission of power would have been very seriously hampered but for the invention of the oil switch. This use of oil has made it possible to rupture easily and safely circuits carrying heavy currents at high voltage, and, further, to open these circuits under conditions of short circuit. The possibility of opening high-tension circuits under conditions of heavy overload has made possible the development and application of the present system of relays. By means of these relays, used in connection with oil circuit breakers, perfect protection can be secured for the apparatus to which they are applied. The term "switch" is given to those

FIG. 1.—EXTERIOR SUBWAY CIRCUIT BREAKER

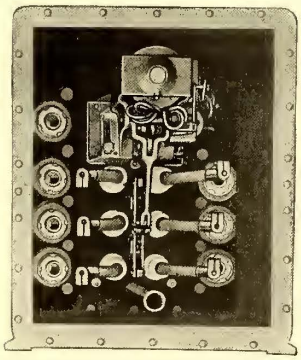


FIG. 2.—TOP OF SUBWAY CIRCUIT BREAKER WITH COVER REMOVED

pieces of apparatus in which the contacts are similar to the ordinary switch, and are opened and closed by hand. Apparatus in which the contacts tend to separate and are only held in a closed position by means of triggers and toggles are called "circuit breakers."

The accompanying views illustrate several new types brought out recently by the Westinghouse Electric & Manufacturing Company. Fig. 1 and 2 show type F oil circuit breaker for potentials of 1100 to 6600 volts and currents of 200 to 300 amps. It is a single-throw circuit breaker and is adapted for mounting in manholes, the case being of cast iron with water-tight, wiped joints. All parts of the circuit breaker are enclosed within the case, yet are convenient of access. The operating mechanism, line connections, calibration, etc., may be exposed to view by removing the top of the case. The leads connecting to the stationary terminals are shown, also the opening through which the outside connections pass, with an extra one on one side for the leads to the solenoids by which the circuit breaker is electrically operated.

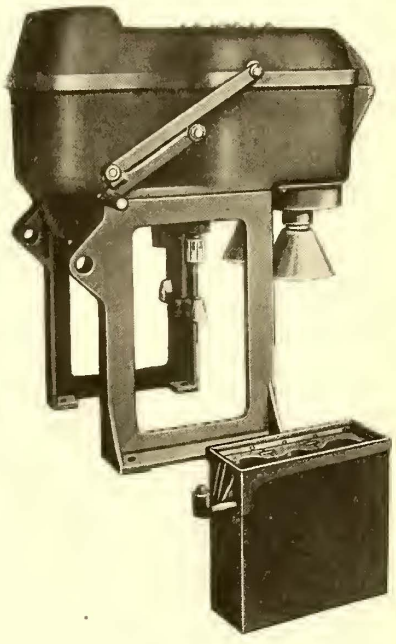


FIG. 3.—EXTERIOR OF BRIDGE CIRCUIT BREAKER

The oil tank of this breaker is bolted to the upper part of the case and can be readily removed to allow an inspection of the contacts. The tank is lined with wood and the contacts have wooden barriers between them. Fresh oil can be poured into the tank, without opening the case, through the tube shown, which extends through the top of the case and is closed by a screw plug.

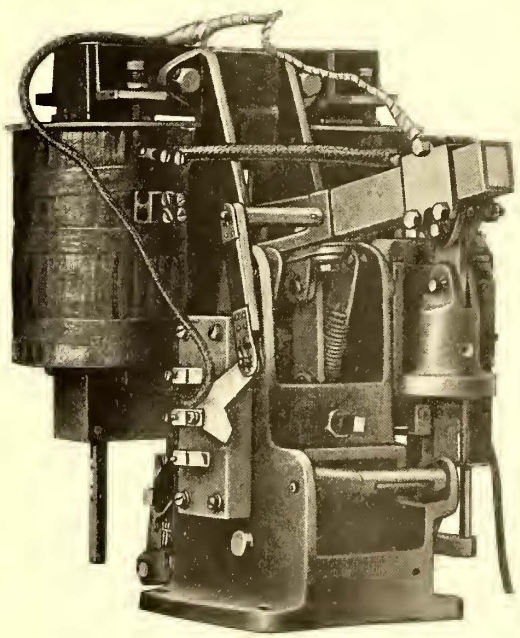


FIG. 4.—INTERIOR OF BRIDGE CIRCUIT BREAKER

Figs. 3 and 4 show a modified type B, which is intended for potentials from 3300 to 22,000 volts and currents from 300 to 1200 amps. This breaker was designed specially for the electrification of the New York, New Haven & Hartford Railway. It is mounted on the bridges which support the catenary line construction, and is therefore entirely enclosed

in a weatherproof case. The upper part of this case contains the tripping and release coils, the current-regulating device and toggle mechanism, and is made of cast iron. The outside leads pass out through the bottom of this part of the case through heavy insulators. The lower part of the case consists of a wood-lined, sheet-metal oil tank, similar to the type B circuit breaker just described.

The bridge type circuit breaker is single-pole, single-throw, and has an automatic overload release mechanism. There are two tripping coils, each energized by a special type of series transformer whose secondary consists of a coil mounted in the case (seen in Fig. 4, just above the line insulator), and whose primary consists of that portion of the outside lead encircled by the secondary coil. This type of circuit breaker is fitted with disconnecting switches, mounted on the cover within the case in such a way that when the cover is raised the breaker is disconnected from the line. The same movement of the cover trips the breaker before the switches are opened, thus preventing arcing on the switch terminals.

CATENARY CONSTRUCTION ON WASHINGTON, BALTIMORE & ANNAPOLIS RAILWAY

Several articles in this paper have described the preliminary work on the Washington, Baltimore & Annapolis single-phase railway now being constructed between those two cities. The work is now far enough advanced to give some details of the overhead line construction, which is of the catenary type. The road is double tracked from Washington to Baltimore, and a pole line is being erected on each side of the right of way carrying side brackets for suspending the trolley wires. The poles are spaced 150 feet apart. The type of bracket used on this section of the line is shown in Fig. 1. These brackets are of T-bar construction 10 ft. 6 ins. in length with 5/8 in. support rod. At the outer end of each bracket is a guide casting, through which is threaded a cable extending across the track between each pair of poles. This cable is extended from each pole obliquely to the ground and there anchored with Miller guy anchors. This gives ample stiffening against lateral vibration. On the single-track branch line extending from Academy Junction to Annapolis a single pole line is used with the type of bracket shown in Fig. 2. These brackets are likewise of T-bar construction and are 11 ft. in length.

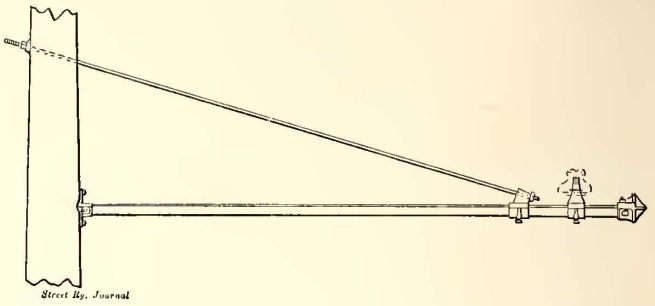


FIG. 2.—BRACKET USED ON SINGLE-TRACK LINE FROM ACADEMY JUNCTION TO ANNAPOLIS

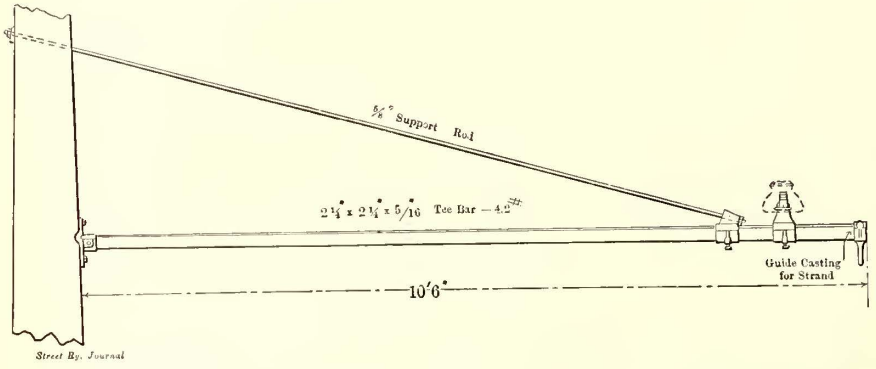


FIG. 1.—BRACKET USED ON DOUBLE-TRACK LINE FROM WASHINGTON TO BALTIMORE

All pole lines are grounded in the following manner: A ground line of 5/16 in. galvanized steel strand is strung along the tops of the poles, and this line is grounded at every fifth pole. On each pole at the back of the pole casting, and in electrical contact with the latter, is mounted a ground plate which is connected by a wire with the ground line carried along the tops of the poles. By this arrangement each bracket is thoroughly grounded. The messenger wire for supporting the trolley is carried on porcelain insulators mounted on malleable-iron pins with Portland cement, the pins being adjustable on the bracket arms.

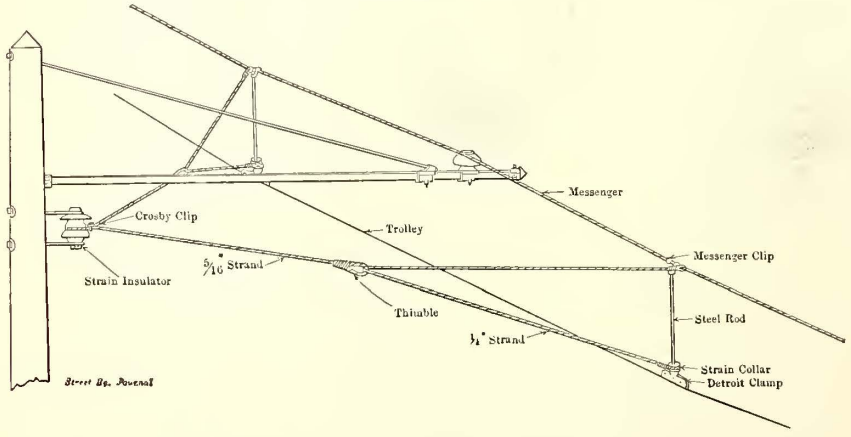


FIG. 3.—SHOWING BRIDLE CONSTRUCTION FOR GUYING TROLLEY WIRE AND MESSENGER ON CURVES

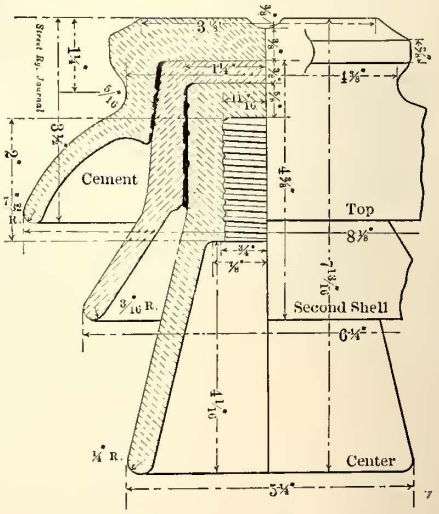


FIG. 5.—33,000-VOLT HIGH-TENSION INSULATOR

On curves the poles are spaced closer, as conditions demand. Here the messenger and trolley are guyed to con-

form to the curve by wires extending from a porcelain strain insulator, mounted on the pole out to the nearest suspension rod and on each side of the bracket shown in Fig 3. Fig. 4 shows the strain insulator used.

The 33,000-volt insulators for the transmission line, the low-tension insulator for the trolley feeders and the telephone insulators are all mounted on the pole lines supporting the trolley wire. Fig. 5 shows the type of 33,000-volt insulator used. This insulator is of triple petticoat construction, the three members being cemented together. The maximum diameter is 9⅜ ins., and the height over all 7 13/16 ins. The insulators are supported on 9-in. oak pins.

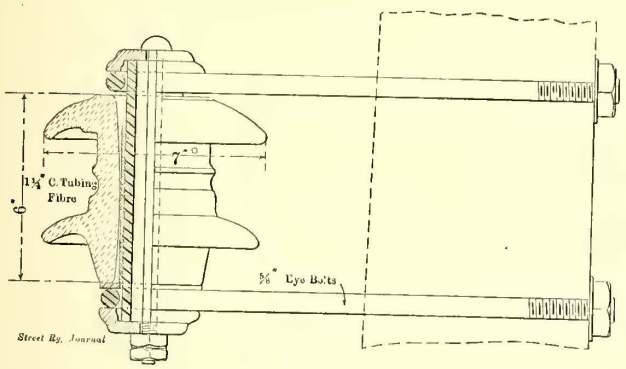
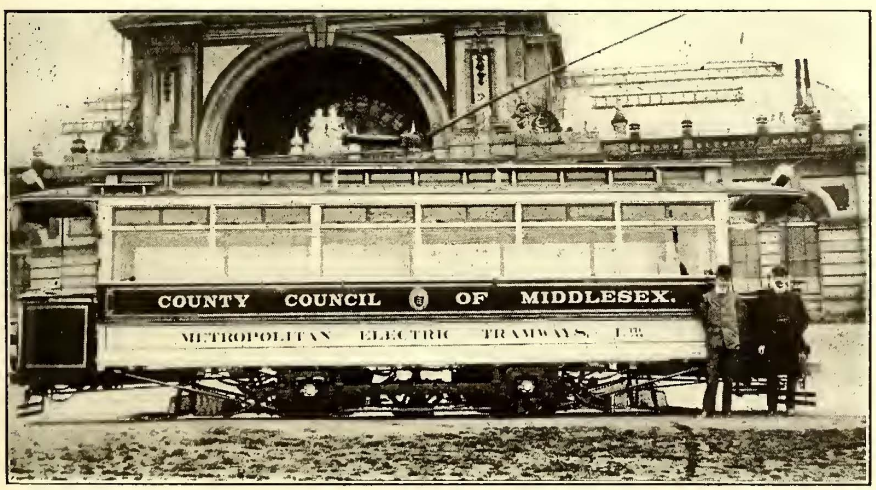


FIG. 4.—STRAIN INSULATOR USED ON CURVES

The material described including the Detroit trolley wire clamps, the Miller guy anchors and other accessories was furnished by the Ohio Brass Foundry.

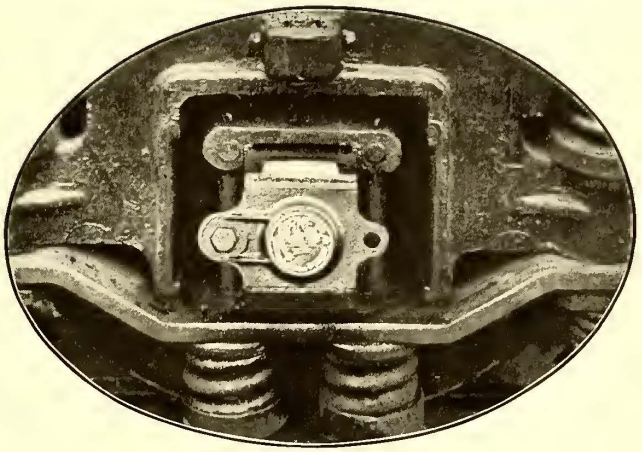
RADIAL OR STEERING AXLE

The accompanying illustration shows a car of the Metropolitan Electric Tramways, of London, equipped with a novel type of radial axles termed a "steering control," owned by the Warner Engineering Company, of London. The explanation given of the action of this steering control on straight track is that a rigid four-wheel truck, with the gage clearance necessary in practice, however equal the wheels or dead parallel the axles, will generally set on the track so that in a few yards it will run hard against the flanges to one side, and when the flange pressure has reached a certain maximum or when a slight kink in the track is encountered, the front wheels of the car are skidded right over to the other side, and in a very short distance the reverse sway occurs. This action can be easily felt when riding in a car, particularly a single-truck car, and is said by some to be a prolific cause of rail corrugation.



CAR OF MIDDLESEX TRAMWAYS EQUIPPED WITH RADIAL GEAR

The second engraving shows the gear for connecting the



RADIAL GEAR

journal boxes to the main frame of the truck. The links shown on either side of the journal boxes swing at an angle to the main frame, passing through radial slots in the yoke bridge, which is the bar passing under the axle boxes, and connect to knuckle joints concealed inside the journal-box springs. The pins passing through the lower ends of these links are set radially to the king-pin in the center of the car.

To produce a movement which is the mechanical equivalent of this at the upper end of the links, where the space does not permit of the pins being set radially to the king-pin, pins parallel to the axle are employed, passing through a bridge piece which rocks transversely on the axle box, while at the same time the axle box itself tilts or rotates to and fro upon its journal.

When the car is standing still it can be swayed horizontally several inches by hand, when the peculiar tilting action of these boxes can be distinctly seen.

A NEW AUTOMATIC STOKER

The Sarco Fuel Saving & Engineering Company, of New York, has recently put on the market an automatic stoker for power stations, although the principle used is so different from that of most stokers that the manufacturers prefer to term it a mechanical shovel. In the device a reciprocating ram deposits a measured amount of coal in front of a pendulous shovel 14 ins. wide, the edge of which swings close to the bottom of a curved pan. The shovel is drawn back by a cam and tappet against a strong "spiral" spring to a point of release, at which point it is swung swiftly forward by the spring. This action projects the coal lengthwise of the furnace to a predetermined point on the grate. By simple mechanism a stronger degree of tension is imparted to the spring at each throw, and the coal is thrown to a correspondingly further distance upon the grate. After the maximum throw is reached, the mechan-

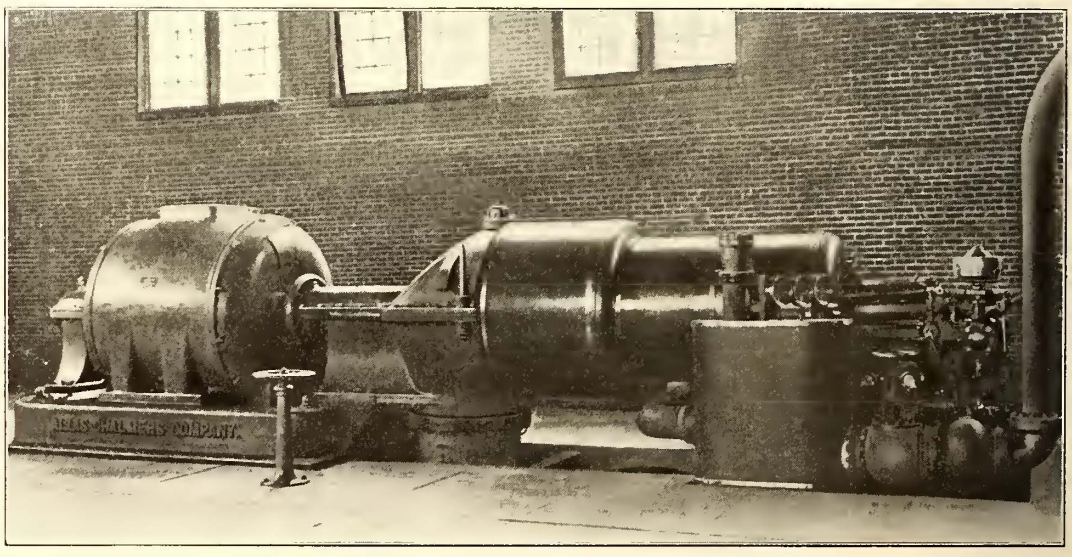
ism returns to the low tension. The change from one to the other is made automatically and with precision. With an allowance of one shovel to about each 3 ft. width of furnace, the result is said to be a very uniform distribution of the coal to all parts of the grate regardless of its length or width. In the device described, the grate and stoker are separate and distinct from each other, so much so that the grates may be supplied by anyone. No change in grates affects the shovel, and the grates may be changed to suit the coal, while the shovel can remain undisturbed.

Among the claims made for the stoker are better distribution of fuel, possibility of using cheap grates and grates of any size, even temperature on grates, flexibility of supply, possibility of using any kind of coal, and of changing at any time to hand firing. Stokers or shovels of this kind are in use by the International Paper Company at its plants at Palmer's Falls, and at Glens Falls, N. Y., and by the Oxford Paper Company, at Rumford Falls, Maine.

TEST OF A 1000-KW. TURBINE AND ALTERNATOR AT THE KOKOMO STATION OF THE KOKOMO, MARION & WESTERN TRACTION COMPANY

An interesting test was recently made of the turbo-generator installed at Kokomo, Ind., in the power house of the Kokomo, Marion & Western Traction Company for the purpose of determining the steam consumption of the turbine when operated under normal load. Through an arrangement with the officers of the Traction Company, Paul Diserens, of Purdue University, working in consultation with Philip H. Palmer, superintendent, represented the Traction Company's interests, and F. C. Purcell represented Allis-Chalmers Company.

The steam turbine is an Allis-Chalmers Parsons standard horizontal turbine. The generator is a standard Allis-Chalmers turbo-alternator, direct-coupled to the steam turbine. The condensing apparatus is of the Allis-Chalmers standard turbo-jet type. The characteristics of the unit are as follows: Rated capacity, 1000 kw; speed, 1300 r. p. m.; frequency, 60-cycle; winding, two-phase; e. m. f., 2300-volt; current per phase (normal), 218 amps. The turbine was built to operate normally with steam pressure of 140 lbs. per square inch gage pressure at turbine throttle, dry saturated, and a vacuum of 23 ins. of mercury, referred to 30 ins. barometer at the exhaust nozzle. The unit is calculated to carry an overload of 50 per cent when operating under the above steam conditions and at 100 per cent power factor. The auxiliary machinery provided consists of a motor-driven exciter, a steam-driven exciter, the jet condenser and pump mentioned above and two small circulating pumps. There are five boilers supplying steam to a loop header. The turbine, two Russell engines and an auxiliary header are supplied from this main header.



1000-KW TURBO-ALTERNATOR THAT WAS TESTED

During the test boilers 3, 4 and 5 were made to supply steam to the turbine being tested. Both sets of boilers were operated at as nearly the same steam pressure as possible. The water delivered to boilers Nos. 3, 4 and 5 was weighed in calibrated barrels. The drip from the steam header and from separators at the Russell engines and at the throttle of the turbine was collected and weighed. At the conclusion boilers 33, 4 and 5 were cut out of service and the entire load of the station was thrown on boilers 1 and 2. With the plant thus operated, enough fire was allowed to remain under boilers Nos. 3, 4 and 5 to maintain a steam pressure equal to that carried by boilers Nos. 1 and 2. The weight of water fed to boilers Nos. 3, 4 and 5 during the test was assumed to establish a rate of leakage and radiation from boilers and piping which would apply to the efficiency test.

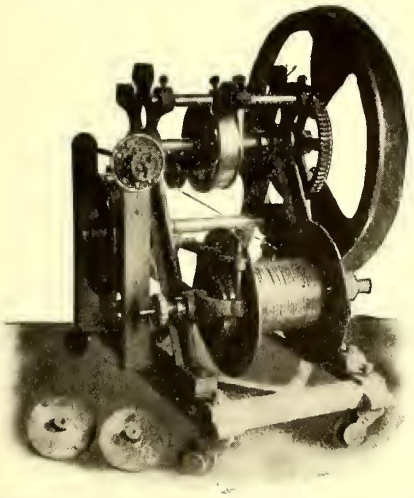
In determining the steam consumed by the turbine, the drip caught at the Russell engines, at the trap in the steam header at the separator at the turbine throttle, and the amount due to leakage and radiation in the boiler, as shown by the leakage test, were subtracted from the water fed to the boilers. This result corrected for the quality of the steam was assumed to equal dry steam supplied to the turbine. The electrical output was measured by carefully calibrated instruments. All the load possible given to the turbine aggregated only a little over half its normal capacity.

Following are the results of the test: Average load, 556.3 kw; per cent of rated load, 55.33 per cent; duration of test, 4 hours; steam pressure at turbine throttle, 136.4 gage; steam pressure at turbine inlet, 61.9 gage; vacuum turbine exhaust, 26.59 ins.; barometer, 28.98; vacuum at turbine referred to 30 ins. barometer, 27.66; revolutions per minute, 1800; total water used, 55,662 lbs.; total drip, 450.6; boiler leakage, 5,344.6 lbs.; moisture in steam by calorimeter, 2.82 per cent; dry steam supplied to turbine per hour 12,115 lbs.; actual consumption of dry steam for kw-hour, 21.90 lbs.

The guaranteed steam consumption for one-half load 28 ins. vacuum was 24 lbs. per kw-hour, and the result of the test showed that the actual steam consumption was 2.1 lbs. less than the guarantee.

A COMBINED TENSION AND BANDING MACHINE

A machine that combines all of the excellent features of the company's tension and banding machines is being offered by the Device Improvement Company, of Hanover, Pa. While the machine, as shown in the accompanying illustration, forms practically a unit, the tension machine may be instantly removed, and the magnet wire tension drum ap-



COMBINED TENSION AND BANDING MACHINE

plied and placed in the most suitable position for field and armature coil winding. The machines in this position are always ready for use without any adjustment whatever, and practically no more floor space is occupied than with one machine. The band wire after leaving the tension machine passes under and through the banding machine to the traveling grooved pulley on the front, and thence to the guide pulley for feeding to the armature. The front of the banding machine in this case is entirely unobstructed by the wire, giving the operator perfect freedom. As the machines in this position form a unit, all strain on the lag bolts holding the machine to the floor is eliminated, and there is no jumping or giving of wire under the greatest tension. On the whole, these machines are said to constitute a reliable banding outfit, easy to operate and very fast.

The Lake Shore Electric Railway has begun operating one through car each way between Sandusky and Toledo on a 2-hour schedule. The car leaves Toledo at 7:30 in the morning. Heretofore passengers making the trip through between these cities have been compelled to change cars at Fremont.

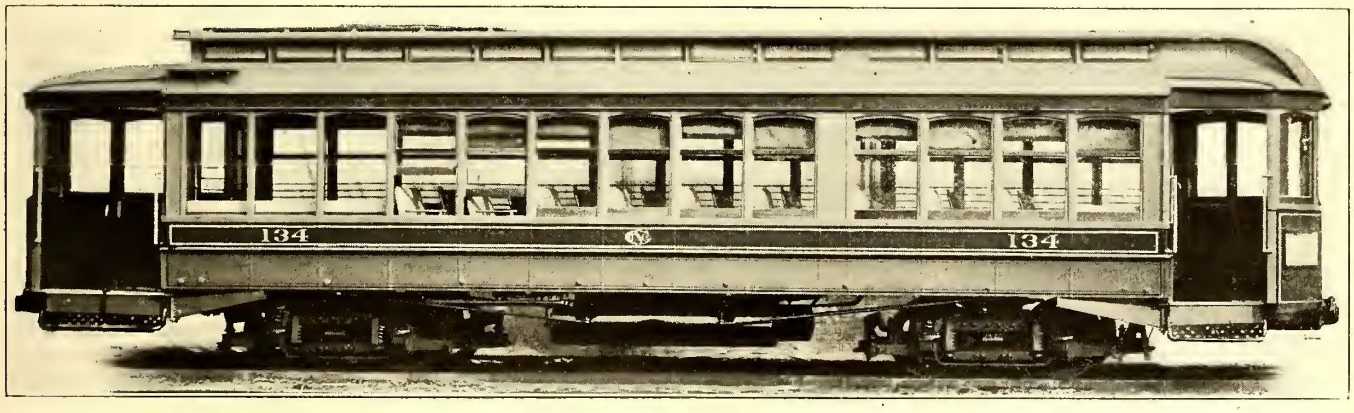
CIRCULAR ON THE OPEN TANK METHOD FOR LUMBER TREATMENT ISSUED BY AGRICULTURAL DEPARTMENT

The United States Department of Agriculture is distributing a circular in which all users of wood will be interested. It is entitled "The Open-Tank Method for the Treatment of Timber," and contains beside the general test, illustrations showing a diagram of an experimental tank used for treating fence posts, diagram of an experimental tank used for treating telephone poles, experimental tank used for treating mine timbers, diagram of a small commercial plant for treating mine timbers, cross-ties, cross-arms, etc. The history of the open-tank method is reviewed, what the method is is explained, the theory of the process is outlined, and the methods employed are all considered. The circular closes with a few words on the application and limitations of the open-tank method and apparatus necessary to apply it successfully.

CHICAGO & SOUTHERN TRACTION COMPANY'S NEW ROLLING STOCK

Extensions on the Chicago & Southern Traction Company have been progressing rapidly. When completed, the system will connect Chicago with Hammond, Chicago Heights, Joliet and Kankakee. There is much pleasure traffic on the lines and the bulk of it is distributed at Calumet Grove, and the parks at Blue Island, Chicago Heights and Kankakee. Fifteen semi-convertible cars supplied by the G. C. Kuhlman Car Company have tended to relieve congestion.

The new cars are of the combination passenger and smoking type and are operated in the one direction only; therefore the entrances are on one side only and steam-coach roof at the front end only. The motorman's compartment is formed by the conjunction of two folding doors, the compartment occupying about one-half the width of the platform. The rear platform is of the familiar "Detroit" type,



COMBINATION CAR FOR CHICAGO & SOUTHERN COMPANY

best calculated to regulate ingress and egress of passengers, and provide extra standing space. A hardwood partition with a swinging door divides the compartments, both of which are equipped with Brill seats with stationary backs and upholstered in spring rattan. Following are the chief dimensions: Length over end panels, 35 ft.; over crown pieces, 8 ft. 6 ins.; over posts at belt, 8 ft. 9½ ins.; size of side sills, 4 ins. x 7¾ ins.; end sills, 5¼ ins. x 6⅞ ins. The trucks are of the Brill No. 27-FE1 type with solid forged side frames; the wheel base is 4 ft. 6 ins.; four motors of 40-hp capacity each are used per car.

LEGAL DEPARTMENT*

EMPLOYEES AS PASSENGERS

The recent decision of the Supreme Court of Rhode Island in Enos vs. Rhode Island Suburban Railway Company (67 Atl., 5), takes the sounder and juster view of a question as to which the courts are not in harmony. It was held that a railroad flagman, who received as compensation for services a weekly sum of money and transportation tickets on the railroad to convey him to and from his work, was a passenger while riding home on one of the tickets after his day's work had been completed, and, therefore, was entitled to recover against the company for damages for personal injuries sustained through the negligence of servants of the company who would have been fellow servants of the plaintiff if the latter had been on duty at the time and place of the accident.

This case is clearly distinguishable from such a case as Russell vs. Hudson River Railroad Company (17 N. Y., 134), in which it was decided by the New York Court of Appeals, that a laborer employed by a railroad company to work in connection with a train of cars under an arrangement to be conveyed to his home every night in such cars free of charge, cannot maintain an action against the company for an injury sustained, while thus riding home, in consequence of the negligence of the engineer. This case was correctly decided, and would doubtless be followed by all jurisdictions in which the fellow-servant doctrine is in force, because the laborer was to be conveyed home by the same train on which he worked, and it even appeared that he might be called upon at any time to render services as a brakeman. So, also, some cases and some text-writers have stated the rule broadly, that whenever an employee has been granted and is availing himself of gratuitous carriage, his status as a servant still attaches, precluding his recovery for injuries occasioned by the fault of another employee.

The decision of the Supreme Court of Pennsylvania in O'Donnell vs. Railroad Company (59 Penn., 239), however, is in accord with that of the Supreme Court of Rhode Island (supra). The Pennsylvania Court said in part: "The work of the plaintiff was wholly at the bridge. * * * At the time of the accident he had finished his day's work and was 10 or 12 miles from the bridge on his way home. Under these circumstances the court below instructed the jury that the plaintiff was traveling as a passenger, and not in the capacity of a servant. * * * He was not hired to pursue his business on the train, but was carried in consideration of a reduction in the price of his wages. When his day's work was performed, he was no longer in the service of the company, but was free to go or stay, and when he traveled in effect paid his fare out of his wages." This case was followed by the later one of McNulty vs. Pennsylvania Railroad Company (182 Penn., 479), to the same effect, clearly establishing its principle as the Pennsylvania doctrine. Such doctrine was disapproved by the New York Court of Appeals in Vick vs. N. Y. C. & H. R. R. Co. (95 N. Y., 267).

As above intimated, we consider the position taken by the courts of Pennsylvania and Rhode Island the more logical as well as the more equitable one. Provided some reference be made to the carriage of an employee on cars on which he is not to work, as one of the inducements and elements of the contract of employment, it, of course, would make no difference whether or not he be given and required to use passenger tickets. In either case he may be regarded as having "paid his fare out of his wages." Nor should the courts hesitate to imply from circumstances an engagement for free transportation to and from work as an integral part of the contract of employment. It has been laid down by one court that "the weight of authority and of sound policy, we think, is that where a servant performs all his work at a fixed place, and the master, either by custom or as a gratuity, carries him to and from his work, the servant doing no service for the master on the train, he is to be treated as a passenger." (Transit Company vs. Venable, 105 Tenn., 460, and cases cited), and see also Dickinson vs. West End Railway (177 Mass., 365.).

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

CHARTERS, ORDINANCES, FRANCHISES.

CONNECTICUT. — Eminent Domain — Condemnation of Land for Street Railway—Conditions Precedent—Corporations—Meetings of Directors—Validity—Attempted Agreement with Landowner—Evidence—Presumptions—Continuance of Fact—Negotiations for Purchase—Necessity—Evidence—Admissibility—Best and Secondary—Condemnation Proceedings.

1. Gen. St. 1902, Sec. 3681, providing that every railroad company before applying to the commissioners for their approval of the location of its road shall deposit with the State Treasurer a specified sum for each mile of its proposed road, when considered in connection with the facts that it was enacted in 1882 when street railways were operated by horses, and that it was placed in the Revisal of 1892, in the chapter relating to steam railroads, and not referred to in the subsequent chapter relating to street railways, and when considered in connection with sections 3680, 3687 and 3844, authorizing railroad companies to acquire land necessary for the construction of their roads, and authorizing every street railway company to purchase land for its road, and regulating the conditions and methods of exercising the power of eminent domain given to steam railroads, does not apply to a street railway company authorized by its charter to take land in the manner provided for taking land for steam railroads, and it need not deposit with the Treasurer of the State any sum for each mile of its proposed road before it can maintain proceedings to condemn land for its road.

2. Four of the seven directors of a corporation held a meeting pursuant to a call made by the secretary of the board by telephonic communication with them. The other three could not be reached before the meeting, and had no notice of it, but after its close they with the other four signed a waiver of notice. Held, that the action taken at the meeting was valid.

3. In proceedings by a street railway to condemn land for its road, it appeared that the approval of the location of the road by the Commissioners was first asked and given in January, 1907, and that the only attempts made by the company to agree with the owners of the land sought to be taken took place in 1906. Held, that it was immaterial that negotiations with the owners for the purchase of the land were not renewed after the approval of the location of the road.

4. Proof that several years before the trial a person was the treasurer of a domestic corporation which failed to thereafter file any annual statement giving the names of its officers as required by law authorized the inference that he was its treasurer up to the time of the trial.

5. Under Gen. St. 1902, Sec. 3687, providing that, when a railroad company cannot obtain real estate for railroad purposes by agreement with the parties interested, it may apply to any judge for the appointment of appraisers to estimate damages that may arise from the taking of the land, etc., and application by a street railway company to condemn land for its right of way cannot be sustained without proof that the company could not obtain the land by agreement with the owner, and it was not enough to prove that it had negotiated, though in the best of faith, with some one not in fact owning the land or representing the owner.

6. In proceedings by a street railway to condemn land for its right of way, evidence that its agent entered into negotiations with a third person who claimed to represent the corporation owning the land sought to be taken, and had in his possession deeds of the land executed to it and named a price for the land which the company declined to pay, and that the agent received several letters in regard to the matter from a third person, one of which was subscribed by the name of the corporation, followed by the name of the third person, was admissible to show

negotiations with one representing the owner, essential to the maintenance of the proceedings.

7. In proceedings by a street railway to condemn land for its right of way, the court did not err in permitting its agent, who testified that he took a draft contract for the sale of the land sought to be taken, and owned by a foreign realty company, to an individual shown by a statement previously filed by the corporation to be its treasurer, to state that the contract, not produced nor its absence accounted for, was drawn in terms as a contract by the foreign company, though the evidence was not the best evidence, the rule requiring the exclusion of secondary evidence not being inflexibly applied in such proceedings.

8. Where, in proceedings by a street railway to condemn land for a right of way, the evidence showed that its agent had entered into negotiations with a third person who claimed to represent the company owning the land sought to be taken, with a view of purchasing the same, evidence of the tax collector of the town where the land was located that the year before he received from the third person a list of the property owned by the corporation which was liable to taxation was admissible to show that the third person acted for the company. —(Stafford Springs Street Railway Company vs. Middle River Manufacturing Company; Same vs. Eastern Connecticut Realty Company, 66 Atl. Rep., 775.)

IOWA.—Courts—Jurisdiction of Federal Courts—Federal Question—Constitutional Law—Impairment of Contracts—Law of State—Street Railways—Grant of Franchise—Construction of Ordinance.

1. A suit by a street railway company claiming in good faith to have a contract with a city giving it a perpetual right to operate its cars in the streets of the city to enjoin the city from impairing such contract by enforcing an enactment of its Council treating the company as a tresspasser and requiring the removal of its tracks from the streets is a suit arising under the Constitution of the United States of which a Federal Court has jurisdiction regardless of the citizenship of the parties.

2. A resolution of a City Council directing the removal from the streets of the tracks of a street railway company is a law of the State, within the meaning of the contract clause of the Federal Constitution, where under the State law the resolution is as effective for the intended purpose as an ordinance would be.

3. That a State Constitution contains a provision prohibiting the passage of any law impairing the obligation of contracts does not deprive the litigant of the right to invoke the similar provision of the Federal Constitution in a suit which involves the question of its violation.

4. In 1866 the city of Des Moines passed an ordinance granting to a street railway company and its successors and assigns the right to lay tracks in any of the streets of the city, and to "operate thereon cars in the manner and for the time and upon the conditions hereinafter mentioned and prescribed." A subsequent section provided that the right granted "shall be exclusive for the term of thirty years," and that the city should not, "until after the expiration of said term, grant to or confer upon any person or corporation any privileges which will impair or destroy the rights and privileges herein granted to said company." At that time there was no statute of the State of Iowa specifically conferring on cities the power to grant franchises to street railroad companies, but such grants were afterward legalized by the Legislature, and there is no statute limiting the term for which such grants may be made. At all times until the year 1905, the city in many ways recognized the franchise as in force, and after the expiration of the thirty-year term required complainant, which had succeeded to the property and franchise of the original company, to pave streets, and construct new lines at large expense. In 1905 the city Council passed a resolution treating complainant as a trespasser, and ordering all of its 70 miles of tracks removed from the streets. Held, that the ordinance granted a franchise in perpetuity, its exclusive character only being terminated at the end of the thirty years, and created a contract which the city could not impair; that complainant was entitled to an injunction restraining the enforcement of the resolution on that ground, and also on the further ground that the city was estopped by its acts from insisting upon a different construction of the contract.—(Des Moines City Ry. Co. vs. City of Des Moines, 151 Federal Rep., 854.)

MICHIGAN.—Street Railways—Sales of Property—Construction of Contract—Property Covered.

An interurban electric road sold to defendant electric railway all its property, privilcges, and assets and all the property, equipment, and material of a construction company used in the construction of the railway and then on the railway or in its vicinity. Plaintiff's assignor had sold to the construction company previous to the sale by the interurban certain electric rotary motors, reserving title until the price was paid, but which contract of sale was not recorded as required by Comp. laws 1897, Sec. 6336, providing that no contract for the sale of railroad equipment should be valid as against bona fide purchasers unless filed for record in the office of the Secretary of State. These rotaries were installed by the construction company after the sale by the interurban under its contract to construct and equip the interurban, and were never fully paid for. Held, in trover upon defendant's refusal to surrender the rotaries or to pay the unpaid balance of the price, that one of the rights of the interurban being the contract right to have these rotaries installed, that right passed to defendant under the clause providing that the interurban sold all its property, rights, and assets, and that plaintiff was not entitled to recover.—(Hogan vs. Detroit United Ry., 111 N. W. Rep., 765.)

MICHIGAN. — Municipal Corporations — Streets — Improvement—Street Railways—Same—Works of Internal Improvement—Parks—Sewers—Waterworks.

1. Neither Detroit city charter, Sec. 169, authorizing the city to establish, pave, repair, and otherwise improve its highways, streets, and avenues, nor Comp. laws, Sec. 3443, requiring the city to keep its streets "reasonably safe and convenient for public travel," authorized the city to own and lay street car tracks in streets to be leased and used by private street railway corporations for hire.

2. The construction and maintenance of parks, waterworks, sewers, and a public lighting system are not works of "internal improvement," within Const. article 14, Sec. 9, providing that the city shall not be a party to or interested in any work of internal improvement, nor engage in carrying on any such work, etc., such undertakings being mere contributions to the public health, safety, and welfare.

3. The construction and ownership of street railway tracks by a city in its streets to be leased for revenue to a street railway company furnishing the equipment, power, etc., constituted a work of internal improvement, in which the city was prohibited from engaging by Const. article 14, Sec. 9, declaring that the State shall not be a party to or interested in any work of internal improvement, etc.—(Bird. Atty. Gen., vs. Common Council of city of Detroit et al., 111 N. W. Rep., 860.)

MINNESOTA. — Street Railways — Liabilities — Purchase of Franchises and Property—Rights of Creditors—Same.

1. Where a street railway company paid the stockholders of another street railway company an agreed price per share, and received from the latter company a conveyance of all its franchises and property without further consideration, the equitable doctrine that the capital stock and property of a corporation is to be deemed a trust fund for the payment of debts, and that when such property has been divided among the stockholders leaving debts unpaid, the stockholders are bound to refund, does not apply to the property and franchises transferred, but to the consideration paid to the stockholders.

2. Under Rev. St. 1899, p. 393, Sec. 1187, pars. 7, 8, giving street railroad companies power to purchase from or sell to other corporations their franchises and other property, a street railway company which purchased the franchises and property of another street railway company paying the consideration to the stockholders of the latter is not liable for debts of the latter company which were not liens at the time of the transfer.—(Hagemann vs. Southern Electric R. Co. et al., 100 S. W. Rep., 1081.)

NEW HAMPSHIRE. — Corporations — Directors — Qualifications—Relation to Another Corporation—By-laws—Powers of Directors—Sale of Assets—Officers Appointed to Execute Contract—Agency—Directors—Change in Directors—Effect—Contract—Sufficiency of Execution—Appeal—Questions Reviewable—Contracts—Separate Agreement—Indivisibility—Appepal—Issues Determined in Lower Court—Trial—Motion to Dismiss Bill—Time for Making—Appeal—Review—Basis for Decree—Corporations—Common Stockholders—Trust Relation to Preferred Stockholders—Evidence—Value of Property—Evidence—Contracts—Sealed Instructions—Alteration by Writing or Lesser Degree.

1. A contract dated December 28 provided for the sale by a construction company of securities, etc., to a trust company for

cash, debentures, stock, etc., and that the trust company should furnish funds to complete work to be done in the construction company's name, and control that company for that purpose. Officers of the construction company were to be selected by the trust company. The contract should not bind the trust company until the other company's property was examined, and the report found satisfactory. Plaintiffs were preferred stockholders in the construction company without voting power, L. holding all the common stock. December 31 the directors of the construction company, L. being one of them, authorized officers to execute the contract, and immediately thereafter three of the five directors resigned, and were succeeded by nominees of the trust company. January 3 the trust company wrote L., president of the construction company, that the examination of the property was satisfactory, and that the trust company would accept the contract if the construction company would pay certain construction expenses, and L. as president wrote the trust company that day that the company would do so. Plaintiffs sued the trust company for an accounting for the assets received, alleging actual and constructive fraud in the contract. Held, that the fact that the construction company's new directors were selected by the trust company did not as a matter of law disqualify them to act as directors upon matters pending between the company between their election and the acceptance of the contract, even if they would be so disqualified afterwards, the presumption being that they would act as directors in good faith and according to law, and that presumption was not weakened by the fact that they were lawyers.

2. The construction company's by-laws providing that the affairs of the corporation should be managed by the directors who might exercise all such powers as were not by law required to be otherwise exercised, subject to the control of the common stockholders, but that no action of the common stockholders would invalidate any prior act of the directors, are in harmony with the law as to the power of the directors.

3. The construction company's certificate of incorporation recited that it was organized to construct railroads, etc., to hold, sell, or otherwise dispose of stocks, bonds, etc., of corporations and to cause the legal estate and interest in any property acquired to be vested in the name of any company to be formed, and either upon trust for or as agents or nominees of the corporation, or upon any other terms considered by the directors for the benefit of the corporation, and to carry out the objects as principals or agents or for the joint account of the corporation, and any company, etc. Held, that their powers were sufficiently comprehensive to include the making of the contract involved.

4. The officers appointed by the directors to execute the contract became agents of the corporation, and not agents of the directors.

5. The omission of the directors to take steps to reconsider the voting of authority to make the contract did not tend to prove bad faith on their part, or control of them by the trust company.

6. A change in directors did not as a matter of law abrogate the authority and direction to the officers to execute the contract.

7. Execution of the contract by the officers bound the construction company and rendered any other acceptance unnecessary.

8. Though the contract was delivered January 3, at the same time the letters between L. and the trust company were exchanged, whether they form a single, indivisible contract is a question of law, depending upon the intention of the parties, the decision of which is reviewable in the supreme court.

9. The contract dated December 28, and that formed by the letters exchanged January 3, do not constitute a single, indivisible contract, but two separate agreements.

10. Where the trial court has decreed for plaintiffs on the theory of constructive fraud, and has not passed upon the issue of intentional fraud, the Supreme Court on reversing the decree will not determine the question of intentional fraud, but will leave it for the superior court to decide.

11. Defendant's motion to dismiss the bill for want of sufficient evidence to support it should have been made at the close of plaintiff's evidence, and before the issues were submitted upon their merits.

12. The trial court having stated the facts found upon which the decree was based, and it appearing therefrom that the question of fraud in fact which was tried and submitted has not been decided, on appeal the Supreme Court will determine the question whether the facts stated authorized the decree, being unable to assume from the general decree that facts sufficient to authorize it were found, since the contrary appears.

13. The common stockholders having entire control of the corporation, the relation of trust between them and the preferred stockholders more clearly appears than in relation of majority to minority stockholders.

14. If required to account, a trust company being chargeable with the value of the property when taken, subsequent developments would be evidence, but not the only evidence of its value.

15. All stipulations by parol anterior to or contemporaneous with a written agreement are merged in the writing, which is conclusively presumed, in the absence of fraud or mistake, to contain the matter as to which the minds of the parties met, and where the final expression and purpose of the parties is by a writing under seal, all other matter in writing is parol and merged in the sealed instrument, which cannot be contradicted or altered by any anterior or contemporaneous writing of less degree.—(Kidd et al. vs. New Hampshire Traction Company et al, 66 Atl. Rep., 127.)
Atl., Rep., 127.)

NEW YORK.—Municipal Corporations—Grant of Right to Use Street for Purposes Other Than Highway—Power to Grant Franchise—Street Railroads—Acquisition of Rights in Streets—License or Consent of Municipality—Prohibition—Nature and Grounds—Same—Motion to Dismiss—Alternative Writ.

1. The local authorities of a village or town may grant a franchise for the building and operating of a street surface railway to two or more rival companies, provided the routes are not the same.

2. The granting of the State railroad commissioner's certificate of convenience and necessity to a railroad corporation is not a prerequisite to the granting to it of a local franchise, but it may obtain the certificate after it has received the local franchise.

3. A railroad corporation, which owns no property, is not a taxpayer or resident of a village, has no vested rights therein, no village consent or franchise, and has applied for none over the route proposed by the defendant company, and has no certificate of convenience and necessity for that route, is not entitled to a writ of prohibition to prevent the village authorities from granting a franchise to defendant to construct a line of trolley railroad through the village.

4. Code Civ. Proc. Sec. 2097, provides that an objection to the legal sufficiency of the papers upon which a writ of prohibition was granted may be taken in the return, and that a motion to set aside the alternative writ for any matter not involving the merits must be made at a term where the writ might have been granted. Held, that an objection to the sufficiency of the papers upon which a writ was granted may be taken in the return or presented at a special term of the court before the return day.—(People ex rel. West Shore Traction Company vs. Bauer et al., 103 N. Y. Sup., 1081.)

NEW YORK.—Street Railroads—Lease of Subway—Rights of Tenant.

The city of New York leased a subway to a railroad company, without restriction as to the right of the lessee to maintain in its stations weighing and vending machines. Held, that the lessee had the right to maintain such machines as is the custom of railroads, where they were purposely placed so that their obstructing or interfering with the public was absolutely impossible.—(City of New York vs. Interborough Rapid Transit Company, 104, N. Y. Sup., 157.)

NEW YORK.—Street Railroads—Extension—Necessity—Evidence—Municipal Corporations—Parks—Streets.

1. On a hearing as to the necessity of an extension of a street railroad before commissioners, evidence that, from the point where the proposed extension ends, petitioner owns a right of way along the street for a long distance, and that it is proposed in time to extend the road along such right of way to and beyond the city limits, is proper to be considered as one of the circumstances bearing on the necessity for such extension.

2. Where a street formerly used as a plank road was conveyed to park commissioners, as authorized by laws 1876, p. 477, c. 445, whereupon the commissioners improved the road as an approach to the park, a part of such road nearly a mile distant from the park did not thereby become part of the park, but was subject to the highway law of the city.—(In re United 104 N. Y. Sup., 157.)

NEW YORK.—Carriers—Street Railways—Transfers—Change of Direction.

Railroad law, laws 1892, p. 1406, c. 676, Sec. 104, requires every street railway company to carry, between any two points on the roads over which it has the right to run cars, any passenger desiring to make one continuous trip between such points for one single fare and without extra charge, and to give the passenger a transfer entitling him to a continuous trip to any point on such road, for the promotion of public convenience. Held, that such section did not prevent a street railway company from adopting a regulation requiring passengers making use of transfers to use the same only in the same general direction of their initial trip.—(Kelly vs. New York City Ry. Co., 104 N. Y. Sup., 561.)

NEW YORK.—Street Railways—Construction of Tracks Across Railroad Bridge—Statutes.

A street railway company cannot lay its tracks on an overhead railroad bridge built by a steam railroad company across its tracks in a street, without either agreeing with the steam railroad company on the amount of compensation to be paid and on the question of the location of the tracks, or having the same determined by Commissioners in accordance with railroad law, laws 1890, p. 1087, c. 565, Sec. 12, notwithstanding laws 1897, p. 794, c. 754, vesting the determination of the matter in which crossings shall be made, whether above, below, or at grade, in the State Board of Railroad Commissioners.—(Lake Shore & M. S. Ry. Co. vs. Chautauqua Traction Co., 104 N. Y. Sup., 550.)

NEW YORK.—Carriers—Street Railways—Passengers—Transfers—Reasonableness of Rule.

A street railway company's rule requiring a passenger to demand a transfer when he pays his fare is reasonable and enforceable.—(Fischer vs. New York City Railway Company, 104, N. Y. Sup., 400.)

NEW YORK.—Carriers—Street Railways—Passengers—Transfers—Sufficiency of Request.

A street railway company is not liable for refusal of a transfer, where a passenger, though desiring to transfer to a westbound car on C. Street, merely asked for a transfer to that street, and was given one to an east-bound car.—(Thistle vs. New York City Railway Company, 104, N. Y. Sup., 401.)

NEW YORK.—Street Railways—Repair of Streets.

Under railroad law, laws 1890, p. 1112, c. 565, Sec. 98, requiring a railroad company to keep in repair that portion of the street "between its tracks, the rails of its tracks and two feet in width outside of its tracks," it is required to keep in repair a space two feet outside of each rail.—(City of Amsterdam vs. Fonda, J. & G. R. Company, 104, N. Y. Sup., 411.)

NEW YORK.—Municipal Corporations—Grant of Right to Use Street—Forfeiture—Waiver—Injunction—Action—Burden of Proof.

1. Where the authorities of a town consented to the building of a railroad upon the streets thereof, on condition that the consent should not be operative until the road should give a bond indemnifying the town against all damages arising from the construction of the road, and on condition that one track should be in operation within two years and that an acceptance of the consent should be filed within a specified time, and there was due acceptance, but the road failed to begin construction work or to give the bond within the required two years, but upon application the authorities waived the defaults and extended the time, and the road was not in default under the amended consent, the owner of property abutting on one of the streets involved could not enjoin the construction of the road on the ground that the default could not be waived.

2. Plaintiff having claimed that the consent should have been on condition that the provisions of Railroad Law, Laws 1890, p. 1109, c. 565, Sec. 92, should be complied with, the burden was upon him to point out those provisions of the law claimed to have been omitted.—(Manton vs. South Shore Traction Company, 104 N. Y. Sup., 612.)

PENNSYLVANIA.—Municipal Corporations—Bridges—Contract with Railway Company—Contract—Construction.

1. A street railway company agreed with a borough to build a bridge, with approaches, so that they would be a part of a municipal street, paved and curbed. A sufficient surface could be obtained only by extending the base of the embankment beyond the limits of the street, so as to encroach on private property, or, if the base was restricted to the street limits, by the building of a retaining wall. The city had not acquired any land for any extension of the width of the street; but the railroad company constructed retaining walls only a part of the distance, and for the remainder widened the base so as to encroach upon private land. On refusal of the railroad company to construct the retaining walls any further, the city finished the work. Held, that the railway company was bound to build such retaining walls, and the borough was entitled to recover the cost of constructing the same from the railway company.

2. Where a railway company and borough agreed to build a bridge and the necessary approaches, the question whether the company was to construct a sewer drop on the bridge approaches under the contract was a question of the intent of the parties, and was for the jury, in an action by the city to recover the cost of completing the unfinished work.—(North Braddock Borough vs. Monongahela Street Railway Company, 66, Atl. Rep., 152.)

PENNSYLVANIA.—Street Railroads—Change of Street—Relaying Tracks—Injunction—Relaying Street Car Tracks—Relaying Tracks—Consent of Borough.

1. A contract between a street railway company and a borough provided that the company should not remove its tracks without the consent of the borough. Thereafter the county reconstructed a bridge on which the tracks were laid, so that they did not align with those on the road. The street railway company secretly and at night took up its tracks to readjust them, without any attempt to obtain the consent of the borough. Held, that an injunction at the suit of the railway company to enjoin the borough from preventing the railway company from taking up the tracks before such consent was obtained would not lie.

2. Where a county changes a bridge so that a street railway company is compelled to move its tracks to align them with a track on the bridge, the borough whose consent is necessary to such change cannot arbitrarily withhold consent or burden its consent with conditions imposing further pecuniary obligations on the company.—(Chester D. & P. Railway Company et al. vs. Darby Borough, 66 Atl. Rep., 357.)

PENNSYLVANIA.—Injunctions—Contracts—Specific Performance—Street Railroads—Location of Tracks—Contract.

1. A contract between a street railway company and a turnpike company will be specifically enforced by a mandatory injunction so as to compel the railway company to lay its tracks at the height and in the location specified in the contract.

2. A contract between a street railway company and a turnpike company provided that the external portion of the track should be placed 20 ft. from and parallel with the center line of a portion of the road, except in running over or under bridges, or where it must from necessity be less than 20 ft. The tracks were laid at one place in the center of the road, and in many places the outside rail was laid 18 ft. from the center with the knowledge of the turnpike company. Held, that the court, at the suit of the turnpike company, would only compel the removal of the tracks at the point where they were placed in the center of the road.—(Chester & Darby Telford Road Company vs. Chester, D. & P. Railway Company et al., 66 Atl. Rep., 358.)

PENNSYLVANIA.—Municipal Corporations—Legislative Control—Street Railroads—Use of Streets—Grant by City—Rights Acquired—Obstruction in Street—Liabilities—Evidence—Opinion Evidence.

1. The Legislature can authorize an electric railway company to lay its tracks and operate its lines on the streets of a city or any other municipality, and may empower the municipality to grant such authority, and to accompany the grant with such restrictions as may seem proper to protect the public in the use of the highways.

2. Where an electric company was authorized by ordinance to operate its railway on a certain street, no inference can be drawn that by the grant of the use of such street it was authorized to exclude the public from it or to operate its railway in a manner to render the street unnecessarily dangerous.

3. A street railway, having authority to use a street, planted a trolley pole in the middle thereof; the pole being about 10 ins. in diameter and standing on a base about 2½ ft. in diameter at the street level and about 18 ins. in height. There was no artificial light on the pole. Held, that the city was liable for the death of a man whose wagon was upset on a dark night by striking the base of the pole.

4. Where a witness described a pole obstructing a street, its size, its location, and all the conditions existing, it was not

error to exclude his opinion as to the danger caused thereby.—(McKim vs. City of Philadelphia, 66 Atl. Rep., 340.)

TENNESSEE.—Carriers—Rules—Power to Make—Fares—Reasonableness of Rules—Questions for Court—Payment of Fare—Making Change—Ejection of Passenger.

1. Carriers may make regulations necessary for the proper control of the cars operated by them, and may within legal limits fix the fare to be charged and the time, place, and manner of payment.

2. Whether a rule of a street railway company requiring conductors to be provided with currency or fractional coins to the amount of $5, and to change bills or coins of that denomination or less when tendered in payment of a 5-cent fare, etc., is a reasonable one, is a question of law.

3. A street railway company, though not having the right to require the exact fare charged to be tendered by its passengers, may fix the limit on the amount of change it will undertake to furnish passengers.

4. A rule of a street railway company requiring conductors to be provided with currency or fractional coins to the amount of $5, and to change money of that denomination or less when tendered in payment of a 5-cent fare, and, on failure of a passenger to tender money of that denomination or less, to put him off the car, is a reasonable rule; and a conductor may refuse to change a $10 bill tendered by a passenger for the payment of the fares of himself and wife, and may, on a failure to otherwise pay the fare, require them to leave the car, though the passenger had no knowledge of the rule.—(Knoxville Traction Company vs. Wilkerson (two cases), 99 S. W. Rep., 992.)

LIABILITY FOR NEGLIGENCE.

ALABAMA.—Carriers—Injuries to Passengers—Action—Complaint—Sufficiency—Evidence—Declarations—Physical Condition—Carriers—Injuries to Passengers—Evidence—Trial—Instructions—Assumption of Facts—Pleading—Admissions by Pleading—Trial—Instructions—Appeal and Error—Review—Conflicting Evidence.

1. In an action against a carrier for injuries to a passenger, the complaint alleged that plaintiff notified the conductor of her intention to alight at a certain street intersection, that the car came to a full stop, and before plaintiff had time to alight the car suddenly started, and as a direct and proximate result thereof plaintiff was thrown to the ground and injured in certain respects, and it was alleged that the damage was caused by defendant's negligence in so starting the car. Demurrers were interposed on the ground that the complaint joined an action of trespass with one in case, on the ground that the cause of action was improperly set forth and that the averments of the complaint were not alleged as facts, and on the ground that the averments were vague, uncertain, and indefinite, and that no facts were alleged putting defendant on notice as to what negligence was relied on by plaintiff. Held, that the demurrers were properly overruled.

2. In an action for injuries, there was no error in overruling an objection to a question propounded by plaintiff to a physician as to what plaintiff complained of when he was called to see her.

3. In an action for injuries to a passenger on a street car, it was proper to refuse to permit the motorman to answer a question as to whether he remembered whether he "had on another white lady," as if he had answered it in the affirmative it would have corroborated the plaintiff, and if he had answered it in the negative the answer would have amounted to nothing, and there was no duty on plaintiff's part to introduce such white woman as a witness.

4. In an action for injuries to a passenger on a street car, owing to the car having suddenly started when plaintiff was about to alight, a requested instruction that, if the car was in motion when plaintiff alighted or attempted to alight, the verdict should be for defendant, was properly refused, as assuming that plaintiff alighted, which might have been taken by the jury as an intimation that plaintiff was not thrown from the car as she alleged.

5. In an action for injuries by the next friend of the injured person, a plea of the general issue admits the character in which plaintiff sues.

6. Where, in an action for injuries, there was no contest as to age and discretion of plaintiff, a requested instruction that plaintiff was of sufficient judgment and discretion to be guilty of contributory negligence was properly refused.

7. A verdict based on conflicting evidence will not be disturbed on appeal, unless the record discloses a decided preponderance of the evidence against the verdict.—(Birmingham Railway, Light & Power Company vs. Moore, 43 S. Rep., 841.)

ALABAMA.—Carriers—Injury to Passenger—Actions—Complaint—Allegation as to Place of Injury—Continuance—Grounds—Loss of Pleadings—Appeal—Review—Showing Error—Record—Negligence—Presumptions—Damages—Amount—Question for Jury—Evidence—Competency of Experts—Damages—Medical Books—Witnesses—Proper Cross-Examination—Appeal—Review—Harmless Error—Pleading—Issues on Proof—Unnecessary Allegations—Instruction—Trial—Reasonable Doubt—Doubt of Individual Juror—Excessive—Injuries to Person—Deliberations of Jury—Quotient Verdict—New Trial—Affidavit of Jurors to Impeach Verdict—Affidavit of Jurors to Sustain Verdict.

1. Where a complaint alleged that plaintiff was a passenger on defendant's car when she received the injury complained of, the duty of the defendant toward her was thus shown, and the averment of a failure to perform this duty was sufficient.

2. The allegation in a complaint that plaintiff was injured while on a car of defendant, which operated its cars in the city of Birmingham, was a sufficient allegation as to the place where the injury occurred.

3. A motion to continue a case on the ground that the original pleadings were lost was properly denied, where the court ordered that the record of the original papers might be used upon the trial in all respects as the original, as expressly provided by Code 1896, Sec. 2644, 2645.

4. Where the original answers to interrogatories are lost, and a certified copy of the same is offered for filing, no error can be predicated on the action of the court in overruling an objection to such copy where there is nothing in the record to show that it was substituted.

5. Where a passenger on defendant's street car was injured by the car colliding with another, and there is no evidence explanatory of the collision, the negligence of defendant is presumed.

6. In a personal injury action, where the evidence varies as to the extent of the injuries received, it becomes a question for the jury.

7. Where a complaint in an action for injuries avers that plaintiff was put to great expense for medical attention, it was proper to ask her on the trial what amount she had paid or was to pay her doctors.

8. Where there is evidence to show the facts substantially as they are embraced in a hypothetical question asked, and the witness was competent to give evidence as an expert, it was not error to allow him to answer the hypothetical question.

9. In an action for injuries, it was proper for plaintiff to show that all and any means known to medical skill were resorted to in the proper treatment of the plaintiff to relieve her from danger.

10. Where, in an action for injuries, there was evidence that plaintiff had appendicitis, superinduced by her injury, it was competent to show the results that followed the disease.

11. Where a person received injuries which she claimed produced appendicitis, it was competent to introduce as evidence parts of standard medical books which related to the disease.

12. Where, in an action for injuries received in defendant's car, the conductor on the car manifested lack of recollection of the incidents of the accident, it was proper cross-examination to ask him: "Is it not a fact that the Godkin baby was very badly injured?" "Did you know the names of anybody on the car?"

13. Where a question objected to is not answered, it is not error to fail to rule it out.

14. In an action for injuries to a passenger, an allegation of negligence on the part of the carrier is sufficient to embrace the negligence of the carrier's servants.

15. In an action for injuries to a passenger, it is not fatal to fail to support with evidence an allegation that the car was wrecked, where no negligence is alleged with respect to the wreck, nor any of plaintiff's injuries attributed to the wreck.

16. Where the complaint alleged other injuries than one claimed to have caused appendicitis, it was not error to refuse to charge that the burden of proof is on the plaintiff to show that the injuries alleged were the proximate cause of the appendicitis.

17. It is error to refuse to charge that plaintiff cannot recover if, after a fair consideration of all the evidence, any indi-

vidual juror is reasonably satisfied by any material part of the evidence that she ought not to recover.

18. Where the evidence in an action for injuries, showed that plaintiff received injuries, one of which superinduced appendicitis, on account of which she had to undergo an operation, which resulted in great injury to her health a verdict for $3,725 was not excessive.

19. To have a verdict vacated on the ground that it was a quotient verdict, it must be shown by competent evidence that the jurors in advance agreed to be bound by a particular mode adopted of arriving at the verdict.

20. The affidavit of a juror is not admissible, on motion for new trial, to impeach the verdict.

21. It is error for a court to refuse to consider the affidavits of jurors on motion for new trial as evidence supporting the verdict.—(Birmingham Railway, Light & Power Company vs. Moore, 42 S. Rep., 1024.)

ALABAMA.—Master and Servant—Injuries to Third Persons—Willful or Wanton Injury—Pleading—Damages—Personal Injuries.

1. Willful or wanton injury is not sufficiently pleaded by a count alleging that, while plaintiff was engaged in leaving defendant's car at a station to which he had been carried therein, defendant's servant in charge or control of the car, acting in the line and scope of his authority as such, wantonly or intentionally caused the car to start or jerk, and thereby wantonly or intentionally caused plaintiff to suffer the injuries set out in the first count; there being no averment or showing of a purpose to inflict the injury.

2. A complaint alleging that plaintiff was thrown down, his ankle broken, his foot, leg, and other parts of his body cut, bruised, mashed, and otherwise injured, and he was shocked, crippled, and disfigured is sufficient to allow proof of a rupture, and also of a broken leg above the ankle.—(Birmingham Railway, Light & Power Company vs. Brown, 43 S. Rep., 342.)

ALABAMA.—Master and Servant—Negligence of Servant—Responsibility of Master—Willfulness—Willful Act of Servant—Evidence—Expert—Subjects of Expert Testimony—Conclusions—Street Railways—Injuries to Pedestrians—Action—Opinion—Insanity—Nonexperts.

1. While an allegation of negligence of a master may be sustained by proof of negligence of his servant, evidence that the master participated in the negligent act of the servant by directing the latter to do or perform the act would operate to change the master's act from negligence to intention or willfulness.

2. Where, in an action for death of plaintiff's intestate by being struck by a street car, there was no evidence that defendant corporation participated in any manner in the willful act of its employee which caused the injury, and did not thereafter ratify such act, a count charging defendant with willfulness or wantonness was not sustained.

3. Where, in an action for death of a pedestrian by being struck by a street car, a witness was qualified to testify as an expert concerning the operation of cars, he was properly allowed to testify to the distance at which a car could be stopped, running at the speed of the car in question.

4. In an action for death of plaintiff's intestate by being struck by a street car, a witness was not entitled to testify that the motorman "seemed to try to stop the car as quick as he could," but should have been required to state the facts as to what the motorman did to stop the car.

5. In an action for death of plaintiff's intestate by being struck by a street car, defendant's motorman, after having testified that when he first saw deceased he was walking in a path two or three feet from the side of the track, was entitled to state whether the car would have struck deceased in passing him at that distance from the track.

6. In an action for death in a collision with a street car, the motorman was not entitled to testify whether he stopped the car as soon as he could, but was required to state what he did to stop the car, and whether that was all that could have been done to stop the car as soon as possible.

7. A nonexpert is required to state the facts on which he bases his opinion in testifying on an issue of insanity.—(Birmingham Railway, Light & Power Company vs. Randle, 43 S. Rep., 355.)

CALIFORNIA.—Street Railways—Bicyclists—Care Required—Collision—Contributory Negligence—Appeal—Review—Harmless Error—Instruction—Burden of Showing Prejudice—Trial—Instructions—Matter Covered by Other Instructions—Hypothetical Instruction—Refusal to Instruct—Inapplicability.

1. Though a bicyclist riding along a street railway track is bound to exercise such care to protect himself from injury as is appropriate to the case, a failure to maintain a constant watch and to listen for cars approaching in either direction is not negligence as a matter of law; he being required to use reasonable care in the exercise of his faculties, and whether he did so being a question of fact.

2. Where in daytime a bicyclist rode about a block and a half along a straight street car line, though there was amply room for him in the roadway, and was struck by a car, he was guilty of contributory negligence barring recovery, it appearing his failure to see or hear the car resulted from absolute inattention to his situation and surroundings, and through his failure to exercise any care whatever.

3. In an action for injury to a bicyclist struck by a street car, error in instructing as to the degree of care required of bicyclists riding along tracks was harmless, where the undisputed evidence showed he was guilty of contributory negligence, barring his right to recover.

4. It is incumbent upon appellant to show, not only abstract error, but prejudicial error on the facts in evidence, and to avail himself of the point that an instruction was erroneous he must bring sufficient evidence to show that upon a proper instruction there might have been a finding for him.

5. In an action for injury to a bicyclist struck by a street car, an instruction on the degree of care required of bicyclists riding along tracks was not erroneous for failing to instruct on the last clear doctrine, where it was covered in another part of the charge.

6. It was not error in an action for injury to a bicyclist to instruct that if the motorman when about a block away saw the plaintiff riding between two tracks and far enough away from the track on which the car was running so that the car could have passed him safely, and that the motorman gave warning of the car's approach, and the front of the car did pass him and plaintiff then, either through excitement or otherwise, lost his balance, veered towards the car, and the rear step of the car struck him, and that the car was running on a straight track, the jury should find for defendant; there being evidence to sustain the hypothesis.

7. An instruction inapplicable to the facts presented is properly refused.—(Hamlin vs. Pacific Electric Railway Company (L. A. 1781), 89 Pac. Rep., 1109.)

CALIFORNIA.—Street Railways—Injuries to Travelers—Instructions—Care Required—Trial—Duty to Request—Collision—Ordinary Care—Refusal of Request—Duty to Request.

1. An instruction, in an action for injuries in a collision with a street car, that it was the duty of the operator of the railway to exercise "ordinary care" and caution in the management and operation of the car to avoid inflicting injury on a person traveling on or using a street on which the car was operated, was not objectionable for failure to require the use of "great care."

2. Plaintiff cannot object that an instruction correctly announcing the law was too general, where he presented no requests for an instruction making it more definite and specific.

3. In an action for injuries to a traveler in a collision with a street car, the court charged that a person operating a street car was bound to anticipate the presence of vehicles and pedestrians on the highway; that he should be watchful to see that the way was clear and to regulate his speed accordingly; that a speed of 8 miles an hour would be negligence, unless it was a safe rate under all the circumstances; and that the motorman was bound to run his car consistent with proper care for the safety of persons using the street, and for the safety of plaintiff. Held, that such instruction sufficiently charged what was required of defendant in order to exercise ordinary care.

4. Where, in an action for injuries to plaintiff in a collision with a street car, an instruction given properly submitted to the jury the question of plaintiff's negligence in not leaving the wagon in which he was seated, before the collision, it was not error for the court to refuse an instruction on such issue in the language of the request.

5. Where plaintiff's requested charge did not require that plaintiff's negligence should be found to have been the proximate cause of his injury in order to preclude his recovery, plaintiff could not object on appeal that the court's modification of such instruction did not contain such requirement.

6. Where, in an action for injuries in a street car collision, none of the instructions requested or given remotely suggested a submission of the last clear chance doctrine, plaintiff could not object on appeal that a modification of a requested charge, submitting plaintiff's contributory negligence, was erroneous, as in effect withdrawing such doctrine from the jury.—(Henderson vs. Los Angeles Traction Company, 89 Pac. Rep., 976.)

GEORGIA.—Trial—Instructions—Carriers — Injury to Passenger.

The plaintiff based his right of action against the defendant upon the negligence of the latter's employees in suddenly and violently starting a car, which had been stopped upon a signal given by the plaintiff, who was attempting to board the car, without giving him reasonable opportunity to do so in safety, in consequence of which negligent act upon the part of defendant's employees he was thrown to the ground and injured; and it was error for the court, after having properly charged upon this (which was the sole theory of the plaintiff, as appears from the petition), to so charge the jury as in effect to authorize them to find for the plaintiff, upon a state of facts entirely different from those upon which the plaintiff by his pleading and evidence rested his right to a recovery.—(Savannah Electric Company vs. McClelland, 57 S. E. Rep., 91.)

ILLINOIS.—Carriers—Carriage of Passengers—Degree of Care Required—Action for Injuries—Instructions—Trial—Misleading Instructions—Cure by Subsequent Instruction—Appeal—Motions for New Trial—Points Relied on—Waiver of Errors—Evidence—Documentary Evidence—X-Ray Photographs—Preliminary Proof—Sufficiency—Witnesses—Cross-Examination.

1. In an action against a railroad company and a street railway company for injuries to a passenger on a street car caused by collision with the railroad train, an instruction that, so far as consistent with the practical operation of its road, it is the duty of a railroad company to exercise the highest degree of care and caution for the safety and security of passengers, while being transported, was not erroneous as requiring a degree of care more or less than was "reasonably" consistent with the practical operation of the road.

2. In an action against a railroad company and a street railway company for injuries to a passenger on a street car caused by a collision with a railroad train, instructions relating to the degree of care required by a carrier of passengers were not erroneous because inapplicable to the railroad company, since a jury could not have understood the instructions as having any relation to the case against the railroad company.

3. In an action for injuries to a passenger on a street car caused by a collision with a railroad train, an instruction that common carriers are required to do all that human care, vigilance, nd foresight can reasonably do, consistent with the character and mode of conveyance adopted and the practical prosecution of the business, to prevent accidents to passengers riding upon their trains, is not objectionable because it uses the words "practical prosecution of its business," instead of "practical operation of its road."

4. In an action against a railroad company and a street railway company for injuries to a passenger on a street car caused by collision with a railroad train, an instruction charging the jury to consider to what extent plaintiff was injured or marred in his personal appearance, and to what extent he may have endured physical and mental suffering as a natural and inevitable result of such injury, was not erroneous as allowing for loss of time, where an instruction given at defendant's request told the jury that plaintiff was not entitled to recover for any loss of business.

5. Where a party filed a written motion for a new trial, in which the grounds and points relied upon were specified, all questions not embraced in the points so filed were waived, and could not be urged on appeal.

6. In an action for injuries to a passenger on a street car caused by the collision with a railroad train, testimony of a witness for defendant, that he was a post-graduate physician and surgeon, and had 12 years' experience in the practice of his profession, and was experienced in the matter of making X-ray views, and that he made the original negatives and prints therefrom, and that the same was correct representations of what they purported to be, was sufficient preliminary proof to authorize the reception of such X-ray photographs in evidence.

7. A physician, testifying for plaintiff in a personal injury suit against a railroad company and a street railway company in regard to the injuries sustained, cannot be asked on cross-examination if the principal part of his professional industry did not consist of consultation with attorneys to secure claims, such as the one in suit, and in consultation to have an arrangement with them for contingent fees.—(Chicago City Railway Company vs. Smith; Chicago & Grand Trunk Railway Company vs. Same, 80 N. E. Rep., 716.)

ILLINOIS.—Pleading—Aider by Verdict—Judgment—Arrest—Defective Pleading—Motion—Carriers—Injuries to Passenger—Action—Question for Jury—Duty of Carrier—Trial—Instructions — Construction as a Whole — Evidence—Opinion—Physical Condition.

1. In an action against a street railway company for injuries to a passenger, allegations that defendant, through its servants in charge of the operation and management of the car, so carelessly and improperly ran, managed, and operated it that as a result the car thereby ran into and collided with a wagon on the track, though general, were sufficient after verdict, to support a judgment for plaintiff.

2. In an action against a street railway company for injury to a passenger, caused by a collision of the car with a wagon driven through an opening in a wall extending parallel with the track, a count of a declaration averred the existence of the opening in the wall, that it connected with a plank roadway laid from the street through the opening, and that "long prior to and at the time and place in question said opening and roadway were used by teams and wagons." Held, that though the extent of the use of the passageway through the opening is not averred, and upon demurrer the averment might have been held insufficient, it was sufficient, on motion in arrest of judgment, to support a judgment for plaintiff.

3. On a verdict for plaintiff, the court will regard every material fact, upon the motion in arrest of judgment, alleged in the declaration or fairly or reasonably inferable from what is alleged, as proved on the trial.

4. In an action against a street railway company for injuries to a passenger, caused by the car colliding with a wagon which was driven through an opening in a wall extending parallel with the track, held, under the evidence, a question for the jury whether the company was guilty of actionable negligence in approaching the opening with its car in the manner in which it did, or whether it had taken such reasonable precaution to warn its servants of the approach of teams through such opening as would reasonably guard its passengers from being injured by cars colliding with such teams.

5. It is a carrier's duty to use a very high degree of care to safely transport its passengers, doing all that human care, vigilance, and foresight can reasonably do, in view of the character and mode of conveyance adopted, consistent with the practical operation of its cars.

6. In an action against a street railway company for injuries to a passenger, caused by collision with a wagon, an instruction that it is the duty of carriers to do all that human care, vigilance, and foresight can reasonably do, under the circumstances and in view of the character and the mode of conveyance adopted, reasonably to guard against accidents, etc., was not erroneous for not limiting the degree of care required to such care as is consistent with the practical operation of the road, where, when considered with other instructions, the instruction could not have misled the jury as to the degree of care required.

7. In an action against a street railway company for injuries to plaintiff while a passenger, the admission of testimony of expert witnesses, who talked with her and made experiments by sticking pins in her flesh and manipulating her limbs, to determine whether or not she was feigning paralysis, and their opinions as to her condition, was not error; the court having repeatedly informed the witnesses that they were to base their opinions only upon what they had seen, and not upon any statements made to them by plaintiff, or upon any physical manifestations of the plaintiff within her control, and having excluded specifically all evidences from the consideration of the jury which could by any possibility be regarded an infringement of the rule against the consideration by them of any subjective condition in the plaintiff brought out during the examination of the witnesses.—(Chicago City Railway Company vs. Shreve, 80 N. E. Rep., 1049.)

ILLINOIS.—Master and Servant—Injuries to Servant—Contributory Negligence—Question for Jury—Trial—Instructions—Construction as a Whole.

1. In an action for injuries caused by a defective step on a

car, where there was no evidence that plaintiff had worked with the car before the day he was injured, or that he had any occasion to see or observe it on the day of his injury before attempting to use it, he cannot be held guilty of negligence, as a matter of law, in failing to see the defective condition of the step.

2. Where an instruction fails to state all the law on the subject, it is not reversible error if what it omits is supplied by other instructions.—(Peoria & P. Terminal Railway vs. Schantz, 80 N. E. Rep., 1041.)

ILLINOIS.—Street Railways—Action for Injuries—Evidence—Sufficiency—Pleadings—General Issue—Matters Denied—Matter of Inducement.

1. Evidence examined, and held sufficient to show that defendant, and not another street railway company, was in the possession and operation of the street car line whose car jumped the track and collided with plaintiff's wagon, thereby injuring him.

2. An averment, in an action for injuries sustained, that defendant owned and operated a street railway, is not denied a plea of the general issue, but such averment can only be reached by a special plea denying that defendant owned or operated the same.—(Chicago Union Traction Company vs. Jerka, 81 N. E. Rep., 7.)

ILLINOIS.—Evidence—Opinion Evidence—Expert Testimony—Bodily Condition—Trial—Objections to Evidence—Carriers—Injuries to Passengers—Action—Issues and Proof—Instructions—Reference to Declaration—Interragatories to Jury—Appeal—Harmless Error.

1. In an action for injuries, a physician who had examined plaintiff, testified that she was suffering from traumatic neurosis, and, after stating that her condition resulted from injury to the bone, was asked "what might cause such an injury as that to the spine," to which he replied, "Transmission." Held, that defendant was not prejudiced by such question and answer, as it would have been competent for plaintiff to have asked and obtained an answer as to whether the injuries plaintiff was suffering from might have resulted from the fall she had described.

2. An objection "no proper foundation laid, and incompetent," to the testimony of a medical expert was a general objection, insufficient to preserve for review a specific objection to the testimony.

3. Where a declaration in an action for injuries to a passenger alleged that the car on which she was a passenger stopped at a certain street, evidence that the car stopped on the south side of such street instead of on the north side, which was the usual stopping place, was not insufficient to sustain the declaration.

4. An instruction to the effect that plaintiff was entitled to recover, if she had proved her case as alleged in the declaration, was not erroneous, though there was no evidence to sustain some of the counts of the declaration.

5. In an action for injuries to a passenger alleged to have been sustained by her owing to the starting of the car while she was alighting, it was proper to refuse to submit an interrogation as to whether plaintiff had proved by a preponderance of all the evidence in the case that the car was standing still when she attempted to alight.

6. In an action for injuries to a passenger alleged to have been sustained owing to the sudden starting of the car while she was attempting to alight, defendant requested the submission of an interrogatory as to whether plaintiff has proved by a preponderance of the evidence that the car was standing still when she attempted to alight, which interrogatory was refused, but one was submitted as to whether plaintiff could by the exercise of ordinary care have avoided the injury, which was answered in the negative. Held, that such interrogatory covered in substance the one refused, so that defendant was not prejudiced by the refusal.—(Chicago City Railway Company vs. Foster, 80 N. E. Rep., 762.)

INDIANA.—Carriers—Injuries to Passengers—Negligence—Evidence—Sufficiency—Contributory Negligence—Question for Jury—Death—Actions for Death—Damages—Trial—Errors in Instructions Cured by Other Instructions—Applicability to Issues—Appeal—Harmless Error—Erroneous Instructions.

1. In an action against a street railway for the death of an infant passenger thrown from an open car, evidence examined, and held to sustain a finding of negligence in running the car at an excessive speed around an abrupt curve, thereby throwing the child from the car.

2. A mother with three children boarded an open street car, and permitted a child 7 years of age to set at the end of a seat next to a wire screen designed to protect passengers. The screen did not reach to the floor of the car, and, while it was going around an abrupt curve, the child was thrown from the seat under the wire screen to the ground, and killed. Held, that the mother was not guilty of contributory negligence of precluding a recovery for the child's death.

3. In an action by a father for the death of a child about 7 years old, a verdict for $1,000 is not excessive.

4. The error in an instruction in an action by a parent for the death of a child that the measure of damages is that sum which under the evidence and the common experience of the jurors would have been the value, etc., arising from the fact that it authorizes the assessment of damages on facts not shown by the evidence, is cured by other instructions informing the jury that everything done by them must be done under the evidence.

5. Where, in an action by a parent for the negligent death of an infant child, no issue as to the child being non sui juris was tendered by the pleadings, instructions leaving to the jury the question whether the child was non sui juris were erroneous.

6. Where, in an action by a parent for the death of a child, there was nothing to show that the child at the time of the accident did not exercise such prudence as was ordinarily possessed by one of his age, nor anything to show negligence judged by the standard of care required of an adult, the error in submitting to the jury the question whether the child was non sui juris, though no such issue was raised by the pleadings, was not reversible.—(Indianapolis Traction & Terminal Company vs. Beckman, 81 N. E. Rep., 82.)

INDIANA.—Appeal—Assignment of Error—Review—Master and Servant—Injuries to Servant—Actions—Complaint—Liability of Employer—Statutes—Construction—Sufficiency—Assumption of Risk—Trial—Special Findings—Damages—Personal Injuries—Excessive Damages—Instructions.

1. An assignment that the court erred in overruling a demurrer to the complaint which does not designate the court which made the ruling is reviewable, where the record shows that the appeal is from a judgment of the circuit court, and that the ruling on demurrer was made by a superior court.

2. A complaint, in an action for injuries to an employee of a street railway, which alleges that plaintiff was injured by the negligence of a third person in defendant's service, to whose order he was at the time of the injury bound to conform, and was conforming, and which shows that third person's authority to give orders to plaintiff and plaintiff's duty to obey, and the giving of an order and the injury to plaintiff while conforming thereto, states a cause of action under Employer's Liability Act, Burns' Ann. St. 1901, Sec. 7083, subd. 2, making a corporation liable for injuries to its employee caused by the negligence of a person in its service to whose order or direction the injured employee was bound to and did conform.

3. The words "order or direction," as used in the statute, apply to special orders, as distinguished from general orders and the protection of the statute does not extend to an employee injured from the negligence of his foreman while working under general directions.

4. A complaint, in an action under such act for injuries to an employee of a street railway, which alleged that plaintiff was in the employ of defendant as a trackman, that on the day of the accident he was ordered by defendant's roadmaster to repair a broken bridge; that at the time the roadmaster had authority from defendant to order plaintiff where to work, and what to do; that the roadmaster ordered plaintiff to clear away debris at the bridge and prepare a footing at a designated spot, to which order plaintiff was bound to conform; and that while conforming thereto he was injured by the negligence of the roadmaster—alleged that plaintiff was injured while obeying a special order, as distinguished from a general order.

5. Under Employer's Liability Act, Burns' Ann. St. 1901, Sec. 7083, subd. 2, making a railroad liable for injuries to an employee caused by the negligence of a person in its service, to whose order the injured employee was bound to and did conform, a railroad cannot defeat an action for personal injuries sustained by an employee in consequence of the negligence of such person by proof of assumption of risk.

6. In an action for injuries to an employee of a street railway, while obeying a special order of a superior, because of the negligence of the latter, the jury in a special verdict found that the superior ordered the employee to do certain work,

and that at the time of the injury the employee was working under "the general order" of the superior. The jury rendered a verdict for plaintiff. Held, that, though the special findings designated the order which the employee was obeying at the time of his injury as a general order, it must be presumed in support of the general verdict that the findings showed that the employee was in fact obeying a special order, thereby removing any inconsistency between the special finding and the general verdict.

7. An employee, 35 years old, sustained an injury necessitating the removal of a portion of his skull. His sight and hearing were impaired, and his nervous system injured, and he was permanently incapacitated from pursuing his vocation. Held, that a verdict for $10,000 would not be set aside as excessive

8. Since one employed to do repair work may rely on the master not negligently or maliciously investing the place where the work is done with unexpected dangers, an instruction that, when one hires out to a railroad to do repair work, he assumes those risks which are incidental to the work, and he cannot rely "wholly" on his employer to make the working place safe, is erroneous.—(Indianapolis Street Railway Company vs. Kane, 80 N. E. Rep., 841.)

INDIANA.—Carriers—Injury to Passengers—Actions—Complaint—Sufficiency—Appeal—Correction of Record—Prejudicial Error—Street Railways—Regulations—Lookouts—Ordinances—Validity—Harmless Error—Admission of Evidence—Evidence—Examination of Experts—Hypothetical Questions—Failure to Submit Issues—Instructions.

1. A complaint in an action for injuries to a passenger on a street car in a collision with a train on a railroad crossing which alleges that "defendant by and through its servants" in charge of the car negligently ran it on the railroad track and collided with a freight car thereon, causing injury to the passenger, shows that defendant's servants had charge of the car and were acting in the line of their employment at the time of the injury.

2. After the close of the evidence on the first trial of an action, defendant obtained leave to amend its answer to correspond with the proof. The amendment did not change the issues. The record recited that the court granted the amendment, and that the same was filed. After judgment plaintiff filed a motion to correct the entry by making it show that the amendment to the answer was by interlineation and not by filing an amended answer. Held, that the action of the court in sustaining the motion and making the correction, if erroneous, was not prejudicial.

3. A municipal ordinance requiring street car conductors to go across steam railroad tracks in advance of their cars, and prohibiting the motorman from moving the cars across the tracks until signaled so to do by the conductors from the opposite side of the tracks, is not unreasonable.

4. Where, in an action by a street car passenger for injuries in a collision between a car and a freight car at a railroad crossing, the uncontradicted evidence showed that at the time of the accident it was cloudy and misting rain, that there was an electric light at the crossing, and that the street car had an electric head-light illuminating the surroundings, the error, if any, in permitting the record of the signal service to be admitted in evidence, was harmless.

5. Where, in a personal injury action, plaintiff had introduced evidence from which the jury might infer that her physical condition as described in a hypothetical question propounded to an expert was produced alone by the injury she had received in the accident complained of, the hypothetical question was not erroneous.

6. Where, in an action for personal injuries, defendant relied on plaintiff's execution of a release of her claim for damages, and the evidence showed that the amount paid in consideration of the release was tendered back to defendant within a day or two after the execution of the release, and that the tender was kept good by bringing the money into court when the suit was brought, the omission of the court to state in its instructions that it was necessary, to justify a verdict for plaintiff, that a tender of the money received by her on executing the release should be proved, was harmless.

7. Where, in a personal injury action, defendant relied on a release executed by plaintiff, and the evidence warranted a finding that plaintiff was at the time of its execution mentally incompetent, and that it was procured by fraud of defendant, the error, if any, in an instruction that if defendant without the knowledge of plaintiff altered the release by inserting therein that if it agreed to pay plaintiff's doctor bills the release was void, was not reversible.—(Indianapolis Traction & Terminal Company vs. Formes, 80 N. E. Rep., 872.)

INDIANA.—Carriers—Street Railways—Injury to Passenger—Evidence—Damages—Excessiveness—Personal Injury.

1. In an action for injury to a passenger as she was attempting to alight from a street car, evidence held sufficient to warrant a finding that defendant was negligent in prematurely starting the car.

2. Plaintiff, while endeavoring to alight from a street car, was injured by the premature starting of the car. She suffered a severe and painful sprain of her ankle, and was confined to her bed eight or ten days from the effects of the injury; her ankle joint being weakened and sore for a much longer time. Held, that a verdict allowing plaintiff $300 damages was not excessive.—(Evansville Electric Railway Company vs. Lerch, 81 N. E. Rep., 225.)

INDIANA.—Street Railways—Actions for Injuries—Questions for Jury—Complaint—Sufficiency.

1. In an action for injuries sustained in being thrown from a wagon by a sudden lunge of the team which was frightened by a street car, held, under the evidence, that the question whether the motorman saw the peril in which plaintiff was placed on account of the fright of her team was for the jury.

2. Where, in an action for injuries sustained in being thrown from a wagon by a sudden lunge of the team which was frightened by a street car, the complaint did not show, except by way of recital, that the motorman saw or heard the signals calling his attention to plaintiff's peril, nor aver that the car was being operated in an unusual manner, nor that plaintiff's mules showed any disposition to go upon the defendant's track, nor that the failure to stop or check the speed of the car was the proximate cause of the injury, and did not aver facts from which it could be inferred that the accident would not have occurred if the car had been checked after the signal to stop had been given, it did not state a cause of action against defendant.—(Folz vs. Evansville Electric Railway, 80 N. E. Rep., 868.)

INDIANA.—Negligence—Questions for Jury—Contributory Negligence—Street Railways—Operation—Injuries—Persons Crossing Track—Evidence—Instructions—Care by Defendant.

1. The question of contributory negligence is for the jury, on a consideration of all the evidence relating thereto.

2. Evidence, in an action to recover for damages from being struck by defendant's car while crossing its track, held, sufficient to sustain a verdict for plaintiff.

3. Where there is a conflict of evidence as to defendant's negligence, the question is for the jury.

4. In an action against a street railway company for damages for being struck by defendant's car while crossing its track, an instruction that it was defendant's duty to exercise care and diligence to prevent injuries to persons lawfully traveling the streets occupied by its tracks, and that it would be liable for a failure to do so, is unobjectionable.—(Indianapolis Street Railway Company vs. Demaree, 80 N. E. Rep., 687.)

IOWA.—Carriers—Injury to Passengers—Negligence—Contributory Negligence—Assumption of Risk—Duty of Carrier—Trial—Instructions—Issues Submitted—Injury to Passengers—Evidence—Husband and Wife—Personal Injuries to Wife—Recovery—Appeal—Harmless Error—Opinion Evidence.

1. Though an interurban railroad, operating cars which for the accommodation of passengers stopped at highway crossings, was not required to provide a passenger platform at such crossings, it was required to exercise reasonable care to enable passengers to alight with as little danger as practicable, and where a car was stopped at a highway crossing, and a passenger invited to alight at a place more hazardous than that at which the car might conveniently have been stopped, the railroad was negligent.

2. A passenger on an interurban car, which stops for him to alight at a highway crossing, may assume that the car has been stopped in a portion of the highway where he is invited to alight, unless warned of danger, and is not conclusively negligent in accepting the invitation to alight at a place which is in fact unsafe, but the question of his negligence is for the jury.

3. A passenger on an interurban car stopping at highway crossings does not assume the risk involved in stopping the car for him to alight at a more dangerous place than the usual

place for alighting, where he had no knowledge of the added danger.

4. An interurban railway company owes a public duty to a passenger to furnish him a safe place to alight at his destination, and is not relieved of that duty by knowledge on the part of the passenger that it had not previously been discharging that duty.

5. Where, in an action for injuries to a passenger while alighting from an interurban car, the same facts which would constitute contributory negligence would also constitute assumption of risk, there was no occasion to charge on assumption of risk after instructions as to contributory negligence.

6. Where, in an action by a passenger on an interurban car for injuries received while alighting at a highway crossing, the court, after instructing the jury to consider only the negligence alleged in the petition, stated categorically the grounds of negligence, without including the alleged negligence in carrying plaintiff beyond the platform at the crossing, the question whether the company was negligent in carrying plaintiff beyond the platform was not submitted.

7. Where the evidence showed that the company did not maintain platforms at a highway crossing, but that approaches to the rails on either side had been planked by it, and the highway had been graded up to the planks, and that it was usual to stop cars for passengers to alight by stepping onto the approach, and that the company did not stop the car until after it had passed the approach, an instruction that if the company stopped the car to allow passengers to alight, and notified a passenger to alight at an unsuitable place, and failed to furnish a reasonably safe place, the jury might find that the company was negligent, was proper.

8. The action of the court in calling the attention of the jury to facts shown in evidence in determining whether the employees of the company should have assisted the passenger to alight, and leaving it for the jury to say whether there was negligence in not giving the passenger assistance, was proper, as the duty to assist passengers to alight might arise under special circumstances.

9. A married woman may recover in her own right for physical pain, suffering, and mental anguish resulting from the negligence of another.

10. Where, in an action by a married woman for a personal injury, there was no evidence of the loss of earning capacity, the refusal to charge that she could not recover damages on that account was proper.

11. Where, in an action for personal injuries, the jury properly found a verdict for $3,000, an instruction on the measure of damages, stating that plaintiff in no event could recover more than $15,000, the amount claimed in the petition, was not prejudicial.

12. Where the questions asked medical witnesses and their answers, taken together, showed that they only testified that plaintiff's injuries were due to some external violence such as that which plaintiff without contradiction sustained, the overruling of objections to the questions as calling for statements as to the cause of the injury and usurping the functions of the jury was not prejudicial.—(McGovern vs. Interurban Ry. Co., 111 N. W. Rep., 412.)

MASSACHUSETTS.—Evidence—Opinion Evidence—Negligence—Injuries to Passenger at Station—Precautions Against Recurrence of Injury—Appeal and Error—Objection Not Made Below—Trial—Questions for Jury—Instructions.

1. Where, in an action against an elevated street railway for injuries received through being crowded off a station platform, the alleged negligence consisting in failing to maintain a large enough platform and in allowing too many passengers to congregate thereon at a time, a witness was properly allowed to answer the question whether, if three cars unloaded thirty-three passengers each on the platform, it would make a fair-sized crowd thereon.

2. Plaintiff was also properly permitted to ask defendant's inspector of surface cars whether the crowd on the platform of the station could be controlled by the number of incoming surface cars allowed to go into the station, by the number of persons admitted into the station through the turnstiles, and if, by controlling them there, the size of the crowd in the station could be controlled.

3. Evidence that subsequent to the action defendant had extended its platform, while also admissible for the purpose of showing that it was practically possible for defendant so to do, having regard to the conduct of its business, was not admissible for the purpose of showing negligence on defendant's part at the time of the accident.

4. Where, in an action for injuries through negligence, no objection was made at the trial that the negligence alleged in the declaration did not cover a certain question, the objection was not open on appeal.

5. In an action against an elevated street railway for injuries, received through being crowded off defendant's station platform by reason of defendant's failing to provide proper platform facilities, a question, asked one of defendant's witnesses, whether or not, in determining the plan of operating a street railway, it was proper to consider the desires of the traveling public, where they can be taken into consideration without interfering with safety in the operation of the road, was properly excluded.

6. In an action against a street railway for injuries received through being pushed off a station platform, which defendant was alleged to have permitted to become overcrowded, plaintiff had a right to go to the jury on the grounds that the platform in question was too small to take care of the passengers who landed on it, and that the guard who should have been on the platform was not there.

7. In an action against a street railway for injuries received through being pushed off a station platform, which defendant was alleged to have permitted to become overcrowded, a requested ruling that defendant was not responsible for accidents happening solely through the ordinary rushing and crowding occurring on the road during rush hours was properly refused.—(Beverley et al. vs. Boston Elevated Railway Company (two cases), 80 N. E. Rep., 507.)

14. Where the answers to certain interrogatories objected to in so far as they could be made more certain from the evidence were fully covered by answers to other interrogatories returned with the verdict, the court did not err in refusing to require the jury to make the answers objected to more specific.

15. Where, in an action for injuries in a collision with a street car, it appeared without dispute that at the time a passenger made a remark to the conductor that there was a man under the car plaintiff's body was being dragged under the fender of the car, the admission of such declaration in evidence, though erroneous, was harmless.

16. Where, in an action for injuries in a collision with a street car, there was no substantial dispute that plaintiff was dragged a certain distance, the admission of evidence of the appearance of the track the next morning for the purpose of showing the same fact was harmless to defendant.

17. Where, in an action for injuries to plaintiff in a collision with a street car, he testified that he had lost his sense of taste and smell, defendant was not prejudiced by the admission of the opinion of plaintiff's wife that such was the fact.—(Indianapolis Street Railway Company vs. Taylor (No. 5,807), 80 N. E. Rep., 435.)

KENTUCKY.—Damages—Excessive Damages—Injuries to Person—Permanent Injuries—Carriers—Injury to Passenger—Action—Sufficiency of Evidence.

1. In an action for personal injuries, where plaintiff was seriously bruised, lost control of her bowels and urine, was subject to hemorrhages, and her physician thought her injuries would be permanent, a verdict of $3,500 is not excessive.

2. In an action for injuries sustained in getting off a street car, evidence examined, and held sufficient to sustain a verdict for plaintiff.—(Louisville Ry. Co. vs. Worley, 101 S. W. Rep., 926.)

NEBRASKA.—Street Railways—Use of Street—Reciprocal Duties—Same—Injury to Horse.

1. The right to use the streets of a city by the driver of a horse and the manager of a street car are equal, and each must use it with reasonable regard for the safety and convenience of the other.

2. Where the motorman in charge of a car sees, or by the use of reasonable care may see, that a horse is unduly frightened by his car, he must do what he reasonably can to prevent danger and damage; but, if the horse shows no signs of fright which are observable to him until too late to stop, he is not negligent in running into a horse which rears and alights immediately in front of the car.—(Olney vs. Omaha & C. B. St. Ry. Co., 111 N. W. Rep., 784.)

KENTUCKY.—Carriers—Street Railway—Injury to Passenger—Damages—Excessive—Personal Injuries.

1. Where one is boarding a street car that has stopped to permit him to board, and the car is suddenly started before he gets safely on it, the company is negligent and liable for any injury he may sustain; it being the company's duty to know that he is safely aboard before starting the car.

2. A $1,250 verdict for personal injuries is not excessive, where before the injury plaintiff was in good health, able to perform the labor necessary to obtain her livelihood, and afterwards was unfit, by reason of pain and suffering caused by it, to follow any occupation requiring physical effort, and a serious, painful, and dangerous operation will be necessary to effect a cure, if one can be effected.—(Louisville Ry. Co. vs. Pulliam, 101 S. W. Rep., 295.)

MASSACHUSETTS.—Carriers—Passengers—Injury in Passing From One Car to Another—Carrier's Liability.

It is not negligence for an elevated railway company to permit passengers to pass from one car to another while the train is at a standstill, nor in such circumstances is it its duty to warn passengers of the existence of a space between the cars.—(Hogan vs. Boston Elevated Ry. Co., 81 N. E. Rep., 198.)

MASSACHUSETTS.—Carriers—Injury to Passenger—Equipment—Inspection.

In an action by a street car passenger for injuries caused by the derailment of the car, owing to a wheel on one of the trucks being loose, instructions that the company was required to exercise reasonable care commensurate with the danger to ascertain the fitness of the equipment before using the same, and that it was for the jury to determine what tests were reasonably required and would have revealed the defect, etc., the court sufficiently stated the law that it was the duty of the company, before using the equipment, to apply every reasonable test to discover if the same was in suitable condition for service, though a paragraph of the instructions, standing alone, might lead the jury to believe that, if the company bought its equipment from a reputable manufacturer, it performed its duty.—(Marshall vs. Boston & W. St. Ry. Co., 81 N. E. Rep., 195.)

MASSACHUSETTS.—Carriers—Injury to Passengers—Negligence—Care Required—Contributory Negligence.

1. It is the duty of a brakeman employed on an elevated railroad to know whether passengers are attempting to leave a car when he closes the gate thereof, and to act accordingly.

2. A passenger on an elevated railroad, who moves rapidly to alight from a car and is injured by running into the gate thereof without observing it or the brakeman closing it, is not, as a matter of law, guilty of contributory negligence, precluding a recovery.—(McGarry vs. Boston Elevated Ry. Co., 81 N. E. Rep., 194.)

MASSACHUSETTS. — Carriers — Who Are Passengers — Master and Servant—Fellow Servants—Who Are.

1. Men engaged in constructing railroad tracks were taken to and from the place of work in a special car furnished by the company for the mutual accommodation of the men and the company. The men paid no fare. Held, that the men were not passengers.

2. Men engaged in constructing railroad tracks, who are taken to and from the place of work in a special car, are fellow servants of the motorman, relieving the company from liability for injuries sustained in a collision between the car and the wagon.—(Kilduff vs. Boston Elevated Ry. Co., 81 N. E. Rep., 191.)

MASSACHUSETTS. — Appeal — Exceptions — Waiver — Failure to Argue—Master and Servant—Death of Employee—Contributory Negligence—Question for Jury—Trial—Instructions—Consideration of Instructions as a Whole.

1. Exceptions not argued must be deemed waived.

2. Where, in an action for the death of a motorman by collision with another car, the evidence showed that when the motorman started he was given a clear right of way by the starter having authority to order the movement of the car, that acting under the order the motorman went forward, that before the collision his car passed around a curve, and that he did not see the other car until a collision was inevitable, the question of the motorman's negligence was for the jury.

3. In an action for the death of a motorman by collision with another car, the evidence showed that when the car was ready to proceed, the dispatcher gave the order for the movement of the car, though he either knew, or in the exercise of reasonable care would have known, that the other car had not passed. Held, that the question of the negligence of the dispatcher, within Rev. Laws, c. 106, Sec. 71, cl. 2, making a master liable for the negligence of an employee exercising superintendence, was for the jury.

4. In an action for the death of a motorman by a collision with another car, the evidence showed that a dispatcher exercising superintendence ordered the car to proceed. The conductor examined the register kept for the purpose, which showed that only two cars had gone in the other direction, when three should have been recorded. The rules provided that under such conditions a car should not leave without a written order until the third car had passed. When the dispatcher gave the order he knew that the third car had not passed. Held that, though the collision would not have occurred if the conductor had observed the rules, the negligence of the dispatcher, arising from his failure to take reasonable precaution to ascertain whether three cars had passed, was the efficient cause of the accident, rendering the employer liable.

5. Where it is claimed that the jury were misled by erroneous statements of the judge in his instructions, the instructions as a whole must be examined, and, if it appears that the jury were not misled, the erroneous statements are not ground for reversal.—(Doe vs. Boston & W. St. Ry. Co., 80 N. E. Rep., 814.)

MASSACHUSETTS.—Carriers—Street Railroads—Contributory Negligence—Negligence—Prima Facie Case—Care Required.

1. Where plaintiff, on boarding a street car, found that it was so crowded that passengers were standing on the platform and runningboard, he was not negligent as a matter of law in himself taking a position on the runningboard.

2. Plaintiff, while riding on the runningboard of a crowded street car, was violently thrown against a passing wagon, and injured, by the rear trucks of the car turning onto a switch as they passed over it, bringing the rear part of the car into collision with the wagon. The entire management of the track and equipment was in the control of defendant, and it offered no evidence either of its supervision and care of the track or of the cause of the derailment. Held, that the facts were sufficient to warrant an inference of defendant's negligence.

3. A street railway company is bound to exercise such reasonable diligence for the safety of passengers as the nature of its business demands.—(Egan vs. Old Colony St. Ry. Co., 80 N. E. Rep., 696.)

MISSOURI.—Carriers—Street Railways—Negligence—Carrying Passengers Beyond Destination—Instructions—Pleadings—Allegations—Materiality.

1. In an action against a street railway for carrying a passenger beyond her destination, evidence held to warrant the submission to the jury of the question whether or not plaintiff was negligently carried to defendant's car house.

2. Where, in an action against a street railway for carrying plaintiff, a passenger, beyond her destination, one allegation of the petition was that defendant failed to put plaintiff off at Nineteenth and F Streets, while another allegation named Nineteenth and V Streets, and one of defendant's own instructions was that, if plaintiff was put off at Nineteenth and V Streets, defendant was not liable, an instruction directing a verdict for failure to put plaintiff off at the latter corner was not misleading; all the testimony showing that plaintiff was to be put off at Nineteenth and F Streets.

3. Where, in an action against a street railway for carrying plaintiff, a passenger, beyond her destination, the petition alleged that plaintiff was carried to defendant's car house, an instruction authorized a recovery, if plaintiff was carried beyond her destination to another and distant part of the city, was not erroneous.

4. Plaintiff's evidence being that she was carried to defendant's car house, which was ten blocks distant, and defendant's evidence being that plaintiff was put off only one block from her destination, the instruction was not subject to the rule that an instruction, which of itself covers the whole case and authorizes a finding for either party, must not exclude from the consideration of the jury any material issue supported by substantial evidence on either side.

5. In an action against a street railway for carrying plaintiff, a passenger, beyond her destination, an allegation in the petition that plaintiff was a stranger in the city was not material to her right of recovery.—(Henderson vs. Metropolitan St. Ry. Co., 100 S. W. Rep., 1111.)

LONDON LETTER

The London County Council has now definitely committed itself to the installation of the G. B. surface contact system in the East end of London as the method of electrification of the tramways from the existing conduit tramways near Aldgate by way of High Street, Whitechapel, Mile End Road and Bow Road to the country boundary at Bow Bridge. As stated last month, the Tramways Committee recommended this system, and though there was some opposition at the subsequent meeting of the Council, the recommendation of the highways committee has been carried. The expenditure will amount to a little more than £72,000. There will be no suspension in the efforts of the Council to extend the electrification of the tramways in London next year, it having been decided by the highways committee to recommend the Council to seek sanction in the next session of Parliament for quite a comprehensive syystem of new tramways. Powers are to be sought for the construction of seven new lines, some of which are short connections, though one or two are important new routes, among them two to make the Crystal Palace more accessible than at present. The overhead trolley will be recommended for these routes and will be adopted if the opposition is not too severe. The total cost of the proposed schemes of the London County Council for next year amounts to £229,000, with an additional £122,000 for street widenings. The tramways will be charged with one-third of this latter amount, the local authorities through whose territory the tramways will run with another third, and the improvement's account with the remaining third.

It was reported some months ago that the district of Lee had been connected with the Southern system of electric tramways, which seemed to give general satisfaction at the time. The speed limit was fixed at 16 m. p. h., however, by the Board of Trade, and the inhabitants of Lee now consider this speed is excessive In consequence a petition to the London County Council has been started to have the speed reduced from 16 miles to 12 m. h. p., and the Lewisham Borough Council has also decided to make a further appeal to the Board of Trade for a like reduction.

In connection with the tramways of London, it is interesting to note that John Burns, M. P., who is president of the Local Government Board, and a Member of the Cabinet, in an address before the International Congress on Housing, spoke very warmly in favor of London's tramways. He stated that the taking of the tramways over Westminster and Vauxhall Bridges had done more to revolutionize the minds of the industrial people of London than twenty-five years of previous housing agitation. Mr. Burns is of the opinion that the system should be developed till London owns 1000 miles of tramways, and favors a penny maximum universal fare and half-penny stages.

With the rapid extension of the tramways system in London and the congested state of London traffic, it would appear that the drivers of tramway cars would have to be men in as nearly perfect physical condition as possible, and Mr. Fell, the chief officer of the tramways, recently arranged that all the drivers should undergo a rigid physical examination by medical officers to see that none of them were suffering from any complaint which would work against them in performing their duties efficiently. The drivers look upon this, however, as an effort by the Council to get rid of a number of the older members of the force, in view of the new Employers' Liability Act. Mr. Fell has publicly stated that there is not the slightest foundation for any such fear. His action has solely to do with the safety of the public, and he considers that it is imperative that every driver should be examined so that there may be no chance of drivers being affected, for instance, with a weak heart, who would be liable to sudden seizure at a critical moment. For the moment the subject has been dropped, but it will doubtless be revived before long.

While on the subject of London traffic, it is interesting to note that as the result of continued agitation for the appointment of a Traffic Board for London, which was recommended by the Royal Commission on London Traffic a year or so ago, such a Board has now been decided upon, and the Board of Trade has announced that it is going to establish a branch of its department for this purpose. Colonel Sir Herbert Jekyell, K. C. M. G., now assistant secretary in the railway department, will have charge of this branch. This is, of course, not exactly what has been desired, being merely a department of the Board of Trade and possessing no further powers than that department possesses, but it will doubtless fulfil its purposes, and will at least be able to give serious consideration to the existing traffic problems and to make preparation of schemes for the regulation of the traffic which would have to be authorized by Parliament later. The Moderate Party of the London County Council, now in authority, is strongly in favor of this Board, though it does not meet with the approval of the Progressives. Sir John Benn, one of the late chairmen of the tramways committee, stated that it would cost the rates at least £33,000 a year, and other Progressives stated that the proper Board to have complete control of the traffic of London was the London County Council itself.

It will be remembered that the starting up of the London County Council power house at Greenwich gave rise to a serious controversy between that body and the authorities of the Greenwich Observatory, owing to vibration and emission of fumes, both of which were inclined to upset the delicate calculations of that invaluable institution. In providing for extension therefore, it was decided some time ago not to make use of any further reciprocating engines, and a contract has just been awarded to Williams & Robinson, of Rugby, for two 5000-kw, three-phase turbo-generators, consisting of their well-known type of turbine coupled to Dick Kerr generators. Though Williams & Robinson were not the lowest bidders, the committee recommended the acceptance of their proposal, giving various reasons why they believed the equipment offered to be the best available. Stiffer bearings, lower peripheral speed, less time necessary in starting and less energy required for excitation than in those of other makes were some of the reasons given by the Council for its action.

The tramcar which was so constructed that it could run on the Leeds and Bradford lines, which are of different gage, has given excellent results during its month's trial imposed by the Board of Trade. The tramways committees of the two Corporations are in negotiation with a view to arranging for a permanent through service. The results of the trials have been formally submitted to the Board of Trade, whose approval seems to be all that is necessary before the regular through service of cars becomes an accomplished fact.

The House of Lords recently gave judgment in one of those tramway cases where a corporation acquires the undertaking from a company, and a question arises as to the basis on which the purchase is to be effected. The tramway in question was situated in the borough of Dudley, and the Corporation contended that the basis of valuation should be "structural basis," while the Stourbridge & District Electric Traction Company maintained that the valuation ought to be the going concern basis.

Mr. Justice Swinfen Eady adopted the former view, and so did the Court of Appeal, and the House of Lords has now upheld the judgment of Justice Swinfen Eady. Lord Collins, who was the dissentient, thought the valuation should proceed on the going concern basis. The difference between the two methods of valuation was as between £16,548 and £32,576.

The natural sequence of the Dundee and Monifieth tramways is, in the opinion of most people, the extension of the system to Carnoustie. This development, it is understood, is likely to be accomplished at no very distant date. A survey of the proposed route has been made, and other arrangements made for forwarding the project.

The Municipal Tramway Association will hold its annual meeting at Manchester from Sept. 25 to 27. Several questions to be discussed deal with matters of urgency, and the debates should prove of exceptional interest. J. M. McElroy, president, and A. R. Fearnley, secretary, are making the usual careful preparations for the meeting, which promises to be as successful as in former years, both from a business and social point of view.

It is understood that a contract has been definitely arranged between the Fife Electric Power Company and the Dunfermline & District Tramways Company for a supply of electricity for the tramways. The tramways, which are intended to serve the district east of Dunfermline as far as Lochgelly and north as far as Kelty, will cover a distance of 15 miles.

Sir Francis Cory-Wright, chairman of the light railways committee of the Middlesex County Council, recently opened the new electric tramway from Palmer's Green to Winchmore Hill by personally driving the first car over the route in the presence of a number of influential people, including Board of Trade, County Council, and tramway officials. This extension will ultimately be carried to Enfield.

After years of negotiation and debate the Town Council of Luton has decided definitely to accept the offer of J. G. White & Company to work a system of electric tramways for Luton. The agreement gives the Council the option of taking over the scheme after five or fifteen years.

An important arrangement has just been concluded between the Hampstead Tube and the Central London Railway for the issue of through tickets between their respective systems. This is the first time in the history of the Central London Railway that through tickets have been issued with any other company, and the new arrangement will tend to bring the Hampstead and Highgate districts into closer touch with the city and West End.

The question of a general revision of passenger fares in London was recently considered at a meeting of officials of the various underground and tube railways and the principal 'bus companies. The meeting was held in private, but at its close it was officially announced that the following resolutions had been passed:

1. That a conference be formed to be called the "London Passenger Traffic Conference."

2. That the object of the conference is to create an organization for mutual conference in regard to fares, routes, and other matters of common interest, and generally to take such action as may from time to time be deemed expedient to promote the general interests of the members thereof.

3. That each company represented on the conference shall be entitled to one vote.

4. That the chairman and deputy chairman of the conference shall be elected by the members at the first meeting held in January in each year, and shall hold office for one year.

5. That any company represented on the conference may at any time record a dissent from any resolution of the conference, and such resolution shall thereupon have no binding effect on the dissenting company.

Norman A. Thompson, consulting electrical engineer, initiator of the scheme for the electrification of the Edinburgh tramways, says he has come to the conclusion that, despite the heavy outlay on the existing tramways, it is a commercially sound proposition to convert the whole undertaking at once to electric working, assuming that reasonable terms would be granted by the Corporation and the present Tramway Company on behalf of any new capital involved, and, further, that the overhead system be adopted practically throughout the town. A financial firm of high standing has been considering the problem in conjunction with himself, and all that has been done is to ascertain that the company is willing to consider being bought out if the terms are agreeable, and the Town Council has been asked how much cash down it would want to sell the present tramways to a new company and grant a concession for working them for sixty years.

Sir Henry Oakley, presiding at the half-yearly meeting of the Central London Railway Company, said that in connection with the Anglo-French Exhibition at Shepherd's Bush, the company proposed to put a small station on a loop line so as to take passengers to and from the entrance of the show. During the six months under review there had been a steadily growing diminution in the number of passengers, the diminution being two millions, or 10 per cent, whilst the cash loss was £16,000. The diminution was altogether due to the intense and increased competition. The ratio of the "Tube's" loss in traffic was now diminishing, and it looked as if the bottom had been reached. Regarding the negotiations for a conference between the railways and the 'bus companies, nothing definite had yet been accomplished, but he looked forward to a successful outcome to the various meetings. As to the revision of their own fares, this was turning out successfully, and the extra penny on the long journey meant an addition to their revenue, without extra cost, of £60 to £70 per day. The dividend at the rate of 1 per cent less than in the corresponding period represented £15,000 less to divide, but there was carried forward £25,000 instead of the £14,000 brought in.

Another serious tramway accident occurred last month, and this time Bradford, a city with many grades, is the sufferer. An electric car with a covered top descending Church Bank, a steep decline into Forster Square in the center of the city, failed to turn the corner, and left the rails, running into a warehouse. The top compartment was smashed away from the body, and the latter, after recoiling from the building, fell over on its side. Including the driver and conductor there were twelve persons on the car, all of whom were more or less injured, while a pedestrian who could not escape the car had his leg broken. After the accident Mr. Spencer, the manager of the tramways, made an inspection of the car and states that he found that the three brakes, the hand brake, the slipper brake, and the electric brake were all in working order, and the condition of the wheels showed that they had not skidded. The cause of the accident is therefore at present not explained.

A. C. S.

SERIOUS ACCIDENT ON AN ILLINOIS SYSTEM

Thirteen persons were killed and seventy-six injured in a head-on collision between a train, consisting of a motor car and trailer, and an empty express car on the Charleston and Mattoon line of the Mattoon City Railway Company at 10:30 o'clock Aug. 30, one mile west of Charleston. Both cars were running at high speed and met as they were rounding a sharp curve. The train was telescoped by the express car and both were reduced to a mass of wood and iron. A confusion of orders received over the telephone is said to have been responsible for the accident.

THE ILLINOIS TRACTION SYSTEM IN ST. LOUIS

The Illinois Traction System has concluded all arrangements to enter St. Louis in the manner contemplated in its original plans. As a result of the action of the Venice City Council the company is enabled to form an adequate independent terminal system in connection with its new bridge across the Mississippi River from Venice to the foot of Salisbury Street in St. Louis. The company has ground for yards, terminals and depots at Salisbury Street in St. Louis, and adjacent to the stock yards at Venice. The land on both sides of the river is situated at the approaches of the proposed bridge. The Venice Council has granted the company rights of way over a mile of city streets and over a mile of private property. The private right of way is for a separate bridge approach. Preparations are being made to begin the construction of the bridge piers as soon as possible. By the time that this work is done, the steel superstructure will be on hand, ready to be placed in position. The intention is to have the line in St. Louis finished when the bridge will be completed.

ARRESTS IN ROCHESTER IN CONNECTION WITH FALSE STATEMENTS IN SECURITY EMPLOYMENT

Judge Chadsey at Rochester has made an example of Harry Hill and Harry Stuckey, who, as announced in the issue of the Street Railway Journal for Aug. 24, were arrested and charged with making false statements to secure employment. The judge imposed a straight sentence of thirty days each in the penitentiary upon the defendants, and added another penalty of $25 fine or an additional twenty-five days in the penitentiary. When arraigned Hill and Stuckey pleaded guilty, admitting that statements they swore to when they took jobs with the company were false. The judge said: "I can readily see how such men make such statements to get positions, but when there is wrongdoing it reflects upon the good names of other employees. They have violated this section of the code. There must be some punishment meted out to them. They will spend thirty days each in the penitentiary and an additional fine of $25 or twenty-five days in the penitentiary."

The section of the code under which Hill and Stuckey were arrested is 570. Stuckey, it was stated in court, is the son of a minister in Altoona, while Hill hails from a city near Altoona. W. C. Callaghan, superintendent of transportation of the Rochester company, and S. S. Crane, of Altoona, manager of the Altoona & Logan Valley Electric Railway, were both in court. Mr. Crane identified Hill and Stuckey as former employees of his company.

The Rochester Railway Company has been after conductors who they think have been "knocking down" recently, and the arrest of Hill and Stuckey was due to some hard work on the part of Mr. Callaghan.

PARK AMUSEMENT ORGANIZATION PROPOSED

An organization of the owners of all of the open-air amusement interests in North America is being proposed by C. H. Oberheide, of New York City and Chicago, who originated and is now acting as vice-president and general manager of the Trenton (N. J.) White City Company. The purpose is to advance mutual interests in securing information for the use of its members regarding construction of various devices, the booking of the best European and American attractions, and the discussion of best business methods in management. It is reported that fifty park owners have already given full consent to the scheme.

It is estimated that there are in the United States about 300 park owners, and that at least $10,000,000 is invested in amusement park enterprises in the United States, Canada and Mexico. Up to the present time no organization has existed to represent these interests. Mr. Oberheide is now in communication with every amusement park owner upon the North American continent, and has formulated a working plan for the purpose of organization.

THE SITUATION IN CHICAGO

Bion J. Arnold, president of the board of supervising engineers in traction matters, has given more fully his ideas on the loop and subway question. He reiterates his former opinion, it would be better if the loop could be abandoned and the cars now run on elevated roads put under ground, but taking into consideration the legal difficulties in the way of taking down the loop, he says the most feasible present plan is to use the structure for through train service and relegate the loop feature to the subways.

"It is probable," Mr. Arnold is quoted as saying, "owing to the geographical conditions which naturally restrict Chicago's business district, that not only the surface and subsurface of the streets but also the supersurface will be required to take care of transportation needs in the future. These facts, combined with the fact that the removal of the elevated structure would be extremely difficult for legal reasons, make it probable that it will have to be utilized in place.

"Whatever is done with it, however, should tend toward through routeing and the increasing of the business district. I am opposed to using the structure for shuttle trains or any other scheme tending to perpetuate this loop feature, but it can be used for through trains from north to south."

Mr. Arnold and the other members of the board of supervising engineers have completed their figures showing the credits due the Chicago City railway for the improvements made in its property between June 30, 1906, and Feb. 1, 1907, the dates when the appraisement of its property was made and the ordinance under which it is now operating went into effect. The total is $1,816,853. According to the ordinance, this must be added to the original appraisement, $21,000,000, making a total of $22,816,853 which the city would have to pay if it bought the property now.

L. C. Krauthoff and George W. Wickersham, of New York, and John C. Hately, Seymour Morris and W. T. Fenton, of Chicago, constituting the committee of reorganization and readjustment of the Union Traction properties, have sent out a statement to all interested stock and bondholders, especially the latter, explaining in detail what they are asked to do in order to perfect the reorganization plan and allow the Chicago Railways Company to accept the ordinances and operate the present Union Traction properties. The arguments addressed to the bondholders, who are the main persons to be considered, is that the entire mortgage indebtedness of the Chicago Railways Company is limited to the amount payable by the city in event of purchase. Under this plan every bondholder is offered dollar for dollar in a new bond, intrinsically worth its face value, and his only contribution to the readjustment is the difference now payable on his bond and 4 per cent for five years and 4½ per cent thereafter.

Justice Brewer, of the United States Supreme Court, has telegraphed that he will be in Chicago Sept. 5 to sit with the Court of Appeals in the hearing of the Union Traction troubles then to be had.

P. S. C. MAKES RECOMENDATIONS FOR IMPROVING SERVICE

The Public Service Commission, of the first district of New York, has adopted five orders providing for changes in the operation of the elevated, surface and subway lines in Manhattan and the Bronx, and ordering the Brooklyn Rapid Transit to show cause why it should not discontinue its ash and garbage trains. In compliance with provisions of the public service act, each common carrier corporation affected has a day on which to appear and present evidence and examine witnesses in regard to the matter contained in the orders. The hearings on the orders will be held from Sept. 16 to 20, inclusive. After the corporations have their "day in court" the orders will formally be issued to them.

The five orders provide for more cars on the surface lines and more trains in the subway and on the elevated. Besides these orders, the Commission issued an order to the Interborough-Metropolitan Company directing it to give Marvyn Scudder, an expert accountant for the Commission, access to all its books, papers and records.

One of the orders directs the New York City Railway Company to increase service on its Madison and Fourth Avenue line by the addition of a total of 180 cars. Another directs that the service in the subway and on all elevated lines be increased 20 per cent for an hour and a half both before and after the rush hours, and to furnish adequate transportation facilities on holidays.

The New York City Railway Company is also ordered to increase the service on its Broadway lines and the lines run in connection with those lines, and in continuation of them over Columbus and Lenox Avenues, Seventh and Lexington Avenues, and also to make other changes in the running of cars.

The fourth operative order directs that numerous through trains shall be run to West Farms over the Second and Third Avenues lines, under certain conditions. This and the order to the Brooklyn Rapid Transit Company comprise the operative orders issued yesterday.

The first order is:

It is hereby ordered that a hearing be had on the 16th day of September, 1907, at 2 o'clock in the afternoon, and at any time or times to which the same may be adjourned, at the rooms of the Commission, borough of Manhattan, city and State of New York, to inquire whether the service and equipment of the New York City Railway Company in respect to the transportation of persons in the First District is unjust, unreasonable, improper or inadequate, and if so found to be to determine whether the following increase in the service and change in the equipment would be just, reasonable, adequate and proper to be put in force, observed and used in the transportation of persons in the said First District, namely:

(1) To increase the present service on the Madison and Fourth Avenue line from 116th Street to Astor Place and Broadway by running thirty additional cars south from 116th Street to Astor Place and Broadway between the hours of 6 o'clock and 9 o'clock a. m. daily except Sundays.

(2) To increase the present service on the Madison and Fourth Avenue line from 135th Street to Astor Place and Broadway by running twenty additional cars south from 135th Street to Astor Place and Broadway between the hours of 6 o'clock and 9 o'clock a. m. daily except Sundays.

(3) To increase the present service on the Madison and Fourth Avenue line from the Brooklyn Bridge by running twenty additional cars north from the Brooklyn Bridge between the hours of 6 and 8 o'clock a. m. daily except Sundays.

(4) To increase the present service on the Madison and Fourth Avenue line from Astor Place and Broadway by running forty additional cars north from Astor Place and Broadway between the hours of half past 4 and 7 o'clock p. m. daily except Sundays.

(5) To increase the present service on the Madison and Fourth Avenue line from Astor Place and Broadway by running thirty additional cars north from Astor Place and Broadway between the hours of 7 o'clock and 12 o'clock daily, except Sundays.

(6) To increase the present Sunday service on the Madison and Fourth Avenue line by running forty additional cars over said line during the day.

(7) To require that destination signs showing the route and all points of destination of the cars should be provided and conspicuously displayed upon each car run over the Madison and Fourth Avenue line.

(8) To require that signs giving the "run number of the cars should be provided and conspicuously displayed upon each car run over the Madison and Fourth Avenue line.

All to the end that the Commission may make such order or orders in the premises as shall be just and reasonable.

Further ordered: That the New York City Railway Company be given at least ten days' notice of such hearing by service upon it either personally or by mail of a certified copy of this order, and that at such hearing the said street railroad corporation be afforded all reasonable opportunity of presenting evidence and examining and cross-examining witnesses as to the matters hereinabove set forth.

STEAM VS. ELECTRICITY THE SUBJECT AT THE NEW YORK R. R. CLUB

The next regular meeting of the New York Railroad Club will be held at the building of the United Engineering Societies on Friday evening, Sept. 20. Max Toltz, of St. Paul, Minn., vice-president and general manager of the Manistee & Grand Rapids Railroad, will present a paper on "Steam Locomotive versus Electric Locomotive." Invitations to formally discuss the same have been accepted by Samuel Vauclain, Baldwin Locomotive Works, Philadelphia, Pa.; C. A. Seley, Chicago, Rock Island & Pacific Railroad, Chicago, Ill.; George Gibbs, chief engineer Pennsylvania Tunnel & Terminal Railroad, New York City; J. E. Muhlfeld, superintendent motive power Baltimore & Ohio Railroad, Baltimore, Md.; H. H. Vaughan, assistant to the vice-president, Canadian Pacific Railroad, Montreal, Quebec.

OHIO ELECTRIC RAILWAY PURPOSES ANNOUNCED

Official announcements have been made regarding the Ohio Electric Railway Company, which set at rest the rumors regarding the purpose of the company. As stated in the last issue of the Street Railway Journal, the company on Aug. 27 increased its capital stock from $100,000 to $25,000,000, half of which is preferred. It was this announcement that caused the circulation of the rumors. The official announcements are as follows:

THE OHIO ELECTRIC RAILWAY COMPANY.

CINCINNATI, OHIO, Aug. 31, 1907.

GENERAL ORDER.

To Officers and Employees The Indiana, Columbus & Eastern Traction Company, The Lima & Toledo Traction Company:

You are hereby notified that the property formerly owned and operated by the Lima & Toledo Traction Company and the Indiana, Columbus & Eastern Traction Company has been acquired by the Ohio Electric Railway Company, and beginning on midnight on this date, will be operated by said company.

Until further notice all officers and employees will be retained in their present positions.

The property will be operated under the following districts:

Western District: Consisting of the lines between Dayton and Richmond and between Dayton and Union City.

Central District: Consisting of the lines between Dayton and Columbus and between Springfield and Lima.

Eastern District: Consisting of the lines between Columbus and Zanesville and between Columbus and Morgans, and that portion of the lines in the City of Columbus as far west as the Big Four crossing.

Northern District: Consisting of the lines between Lima and Fort Wayne and between Lima and Defiance and between Lima and Toledo. HERBERT MCNULTA, President.

THE INDIANA, COLUMBUS & EASTERN TRACTION COMPANY.
THE LIMA AND TOLEDO TRACTION COMPANY.

CINCINNATI, OHIO, Aug. 31, 1907.

GENERAL ORDER.

To Officers and Employees The Indiana, Columbus & Eastern Traction Company, The Lima & Toledo Traction Company:

You are hereby notified that the property formerly owned and operated by the Lima & Toledo Traction Company and the Indiana, Columbus & Eastern Traction Company has been acquired by the Ohio Electric Railway Company, and beginning at midnight on this date will be operated by said company.

W. KESLEY, President.

STREET RAILWAY PATENTS

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

UNITED STATES PATENTS ISSUED AUG. 20, 1907

863,580. Underframe for Cars; Enton Becker, Columbus, Ohio. App. filed May 10, 1907. Provides means whereby the underframe can be adapted to trucks of more than the usual height so that the coupling devices will be made to properly align with the coupling devices on cars having trucks of standard height.

863,587. Rail Supporting Device; John W. Carraway, St. James City, Fla. App. filed April 13, 1907. Stringers having rail seats therein are mortised to the cross-ties.

863,609. Electrically Signaling from Moving Trains; Alva D. Jones, Louisville, Ky. App. filed Dec. 3, 1906. An apparatus actuated by the steam or smoke issuing from a locomotive for completing an electrical circuit to operate signals, etc., by chemical means, as the train passes.

863,615. Metallic Car; Joseph L. Levy, New York, N. Y. App. filed May 18, 1903. Details of construction of a hopper car.

863,667. Relay; Jacob B. Struble, Wilkinsburg, Pa. App. filed Feb. 18, 1907. A relay for use in railway signaling in which sectional track rails are charged by an alternating current and connected by inductive bonds are used.

863682. Railway Tie; Samuel H. Warren, Hurricane, Tenn. App. filed May 6, 1907. A metallic rail having adjustable rail-chairs thereon.

863,690. Trolley Device; Samuel E. Belcher, Los Angeles, Cal. App. filed Jan. 10, 1906. Pneumatic means to aid in repositioning the trolley wheel on the wire when it has left the same.

863,694. Car Mover; George Bolinger, Neodesha, Kan. App. filed Dec. 31, 1906. Details.

863,699. Extension Car Step; James H. Cameron, Paris, Texas. App. filed April 29, 1907. A temporary extension step for the car which may be readily folded and pushed back to a position beneath the platform or lower step.

863,744. Air Brake Coupling; Edward D. Nelson and William L. Brown, Altoona, Pa. App. filed Feb. 20, 1906. In an air brake system, an air pipe connection including a coupling hose having metallic end couplings and a flexible body, said body having an inner rubber tube surrounded by an outer fabric tube permeable to air through the interstices of the fabric and entirely disconnected with, but supporting the inner tube, and of sufficient strength to prevent a serious deformation and rupture of the inner tube on the formation of an initial leak therein, thereby preventing said leak from causing an emergency application of the air brakes.

863,746. Air Brake Apparatus; Edward D. Nelson and William L. Brown, Altoona, Pa. App. filed May 21, 1907. A special construction of hose designed for the train pipe and line connections of air brake systems.

863,755. Controlling Apparatus for Railroad Signaling; Petrus J. Portman, Amsterdam, Netherlands. App. filed June 8, 1906. Signal system operated by magnetic induction by which the engineer is kept informed of the condition of the trolley conductor both ahead and behind his train.

863,785. Automatic Air Brake System and Engineer's Valve; Fred B. Corey, Schenectady, N. Y. App. filed May 25, 1904. Means controlled by the engineer's valve for breaking the connection between the train-pipe and the triple valve on the locomotive when said engineer's valve is moved to connect the train pipe for releasing the brakes.

863,788. Rail Joint; Robert A. Dinsmore, New Athens, Ohio. App. filed March 29, 1907. The fish-plates have hook-shaped lugs which pass through the webs of the rails and engage one another.

863,318. Rail Bond; Ben Willard, New Orleans, La. App. filed March 31, 1899. The bond consists of a single strand conductor provided at its ends with a plurality of contacts flexibly connected to each other.

863,823. Combined Automatic and Straight Air Brake; Edward A. Wright, Edgewood Park, Pa. App. filed Dec. 19, 1904. An independent brake valve adapted to control a supply of air from the main reservoir to the driver brake auxiliary reservoir, whereby the brakes on the locomotive may be controlled independently of the automatic train brakes.

863,835. Rail Joint; George R. Clifford, Chicago, Ill. App. filed April 9, 1906. The fish-plates and bolts are of heavy construction and the object of the invention is to provide rigidity of the joint.

863,849. Load Brake Apparatus; Herbert T. Herr, Denver, Col. App. filed Dec. 1, 1904. Provides for the application of an increased braking force by fluid under pressure from a supplemental reservoir acting on the piston of a supplemental brake cylinder, when an increased or additional braking force is required.

863.865. Railroad Signal Device; William Michel, Columbus, Ohio. App. filed April 8, 1907. A lever or stop located adjacent to the rail to operate a valve located on the locomotive whereby a signal is actuated.

863,866. Rail Joint; William B. Michel, Buffalo, N. Y. App. filed April 27, 1907. The abutting rail-sections have reinforced webs to form shoulders, and the fish-plates have reinforced ends

forming shoulders which engage with the shoulders on the webs.

863,871. Car Underframe; Harry M. Pflager, St. Louis, Mo. App. filed March 9, 1907. Details of construction.

863,904. Railway Car; Harry Cohen, Philadelphia, Pa. App. filed May 13, 1907. A car having seats arranged crosswise thereof and doors at both ends of each seat adapted to be raised and lowered. Station indicating apparatus.

863,912. Detector Bar; Walter E. Foster, Chicago, Ill. App. filed June 8, 1906. A detector bar mounted adjacent to the rail and movable upwardly and laterally to engage a face of a wheel on the rail

863,913. Block Signaling Apparatus; Walter E. Foster, Chicago, Ill. App. filed April 25, 1907. A signal locking device arranged to be operated by a reversal of the line polarity, and means whereby the passage of a train into and out a block automatically reverses the line polarity and thereby operates the lock.

863,935. Hanger Strap or Handhold for Cars; John F. Newton, Jr., Boston, Mass. The handhold of the strap is provided with a non-absorbent material.

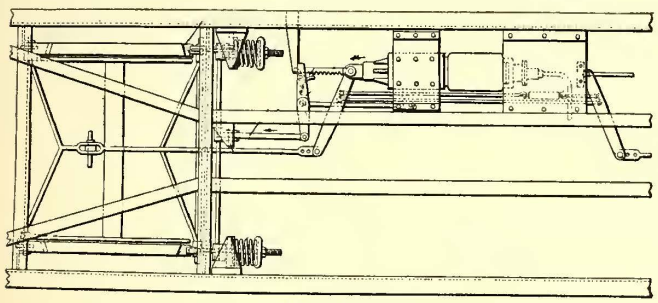
863,954. Snow Plow; William C. Vague, Brooks, Minn. App. filed April 11, 1907. Embodies a longitudinal conveyor for initially removing the snow from the track and a transverse conveyor for receiving the snow from the longitudinal conveyor and throwing it to one side of the track.

863,984. Trolley; Nelson J. Greenison, New York, N. Y. App. filed Jan. 28, 1907. The trolley wheel is swiveled on a vertical axis on the end of the trolley pole and is constrained to move within a limited arc of angular movement by cars or lugs thereon.

863,987. Railway Tie; Thomas G. Hamilton, Pittsburg, Pa. App. filed Feb. 18, 1907. A trough-shaped open top tie composed of plate metal bent to provide a supporting base, upwardly and inwardly sloping sides and outwardly extending flanges, with stiffening abutments and recesses pressed in the sides, bottom and top portions, and having its ends cut off at an angle backwardly and upwardly from the lower terminals of the tie.

864,000. Rail Joint; Michael Kalina, Braddock, Pa. App. filed Jan. 30, 1907. A base and integral fish-plates adapted to engage the rail ends and be secured thereto by a pin and key.

864,108. Automatic Coupling; James C. Sands, Dover, N. J. App. filed Dec. 4, 1906. Relates to the automatic coupling of



NO. 864,120

train pipe systems, including the steam, air and water mains.

864,120. Brake Mechanism for Railway and Other Vehicles; Harvey E. Brown, Norbury, Eng. App. filed July 24, 1905. Utilizes the tangential pull of the brake blocks for counteracting the direct pressure incidental to the application of the brake and thereby reduces the amount of pressure between the brake blocks and the wheels.

864,121. Brake Mechanism for Railway and Other Vehicles; Harvey E. Brown, Norbury, Eng. App. filed April 20, 1907. In railway brake mechanism, means co-operative with and actuated by the tangential pull on the blocks for definitely and positively arresting the application of the brakes, whereby the brake blocks are caused to move towards or away from the wheels and thereby produce a variation of pressure thereon.

864,137. Tie Plate; Willis McKee, Elyria, Ohio. App. filed June 2, 1905. A rolled tie plate bar having a transverse abutment and longitudinal ribs and having a straight flat upper surface.

PERSONAL MENTION

MR. J. T. PORTER, having resigned from the Shreveport Traction Company, of Shreveport, La., to engage in the electrical construction business, Mr. H. H. Lunsford has been appointed superintendent and Mr. D. G. Rushing, master mechanic.

MR. A. F. SCHOEPF, superintendent of the Columbus and Springfield and Grove City divisions of the Indiana, Columbus & Eastern Traction Company, who has been on an extended leave of absence to recuperate his health, is expected to take up his work again in a few days. He is much improved in health.

MR. WILLIS C. CONRAD has been appointed claim agent for the New Orleans Railway & Light Company, to succeed Mr. William H. Renaud, recently appointed private secretary to President Foster. Mr. Conrad has been in the service of the company as assistant claim agent since the consolidation of the various railroad companies in New Orleans, having served prior to that time as claim agent for the New Orleans & Carrollton Railroad, Light & Power Company.

MR. C. T. CONVERSE, who has been connected with the Woonsocket Street Railway Company since last February, has been appointed traveling auditor for the New England Investment & Security Company, with headquarters at Boston. Mr. Converse, previous to coming to Woonsocket, was in Millbury, Mass., for a period of seven years. When the Woonsocket line went under new management he was made the personal representative of the New England Investment & Security Company.

MR. WILLIAM H. RENAUD, claim agent of the New Orleans Railway & Light Company, has been appointed as private secretary to President Foster of the company, and specially assigned to the duty of car-service improvements. Mr. Renaud is one of the best informed men in the service of the company, having long been identified with the company and its constituents. He served the New Orleans Traction Company under the administration of Mr. H. M. Littell and also under that of Mr. C. D. Wyman.

MR. E. R. COFFIN, vice-president of the Electric Bond & Securities Corporation of New York, which controls a number of electric light and railway properties throughout the United States, died suddenly Sept. 2 at the Omaha General Hospital, where he was taken a week ago while traveling from San Francisco to New York. Mr. Coffin was born in Lynn, Mass., July 28, 1873. After being graduated at Harvard University, where he took the degree of A. B., he entered the Harvard Law School, from which he was graduated in 1896. He was admitted to the bar of Massachusetts, and later practiced in New York City until November, 1904, when he became vice-president of the Electric Securities Corporation. His father was Mr. C. A. Coffin, president of the General Electric Company.

MR. GEO. STANLEY has resigned as purchasing agent of the Cleveland Electric Railway Company to come East and manage his interests in the New York & North Shore Railroad, which proposes to build an important system to connect Mineola, Port Washington and a number of towns along the sound side of Long Island. This is the second company that Mr. Stanley, together with Cleveland interests, has been connected with on Long Island. The other was the New York & Long Island Traction Company, operating between Mineola, Hempstead and Freeport, which was sold to the Belmont interests, controlling the Long Island City lines and the traction properties in New York. Mr. Geo. Stanley is a brother of John J. Stanley, vice-president and general manager of the Cleveland Electric Railway Company, who is a member of the Andrews-Stanley-Vanderbilt syndicate.

MR. R. W. BAILEY, of the Alton division of the East St. Louis & Suburban Railway Company, has resigned and will go to Peoria to become general superintendent of the Peoria Railway system, owned by the McKinley syndicate. Mr. Bailey has been connected with the syndicate owning the East St. Louis & Suburban for many years. He was the receiver of the line from St. Louis to St. Charles, and before going to Alton had a responsible position in the operating department of the East St. Louis Railway system. The office of superintendent of the Alton division is subordinate to that of the general superintendent, held by Mr. G. C. Pierce, and that of general manager, held by Mr. L. C. Haynes. No superintendent will be appointed to succeed Mr. Bailey. The Alton business will be handled from the East St. Louis offices of the company, and Mr. T. W. Gregory, auditor of the company, will spend half his time in Alton. Mr. R. C. Hardy, chief clerk, will have his authority extended over the Alton division. Mr. Bailey has been presented with two handsome testimonials by the employees of the company at Alton as a token of esteem. The members of the street railway employees union, conductors and motormen, gave Mr. Bailey a beautiful gold emblem of the Order of Elks, the neck being studded with diamonds, while the office force gave him a handsome watch fob.

TABLE OF OPERATING STATISTICS

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

Company.	Period.	Total Gross Earnings.	Operating Expenses.	Net Earnings.	Deductions From Income.	Net Income, Amount Available for Dividends.
AKRON, O. Northern Ohio Tr. & Light Co.	1 m., July, '07	209,040	110,149	98,891	43,624	55,267
	1 " " '06	183,744	100,937	82,807	40,660	42,147
	7 " " '07	1,058,297	623,554	434,743	296,359	138,384
	7 " " '06	935,685	581,025	354,660	280,413	74,247
CHAMPAIGN, ILL. Illinois Traction Co.	1 m., July, '07	329,601	*183,318	146,283	.....	.....
	1 " " '06	262,725	*136,708	126,017	.....	.....
	7 " " '07	2,035,918	*1,158,200	877,718	.....	.....
	7 " " '06	1,625,595	*913,151	712,444	.....	.....
CHARLESTON, S. C. Charleston Consolidated Ry., Gas & Elec. Co.	1 m., July, '07	67,298	38,619	28,679	13,517	15,162
	1 " " '06	61,727	34,564	27,163	13,017	14,147
	5 " " '07	302,942	185,667	117,274	67,583	49,691
	5 " " '06	272,214	162,708	109,506	64,933	44,573
CHICAGO, ILL. Aurora Elgin & Chicago Ry. Co.	1 m., June, '07	136,909	70,455	66,454	27,650	38,804
	1 " " '06	113,155	60,043	53,112	24,939	28,173
	12 " " '07	1,332,597	722,776	609,820	319,100	290,720
	12 " " '06	1,175,821	645,392	530,428	294,018	236,410
Chicago & Milwaukee Elec. R.R. Co.	1 m., July, '07	117,096	42,559	74,537	.....	.....
	1 " " '06	97,425	33,485	63,939	.....	.....
	7 " " '07	551,604	236,914	314,691	.....	.....
	7 " " '06	429,298	177,279	252,019	.....	.....
CLEVELAND, O. Cleveland, Painesville & Eastern R.R. Co.	1 m., July, '07	34,401	*15,893	18,508	6,796	11,712
	1 " " '06	32,631	*15,774	16,856	7,108	9,748
	7 " " '07	157,587	*84,225	73,362	50,072	23,290
	7 " " '06	146,518	*81,876	64,642	48,314	16,328
Cleveland, Southwestern & Columbus Ry. Co. (Incl. Ohio Central)	1 m., June, '07	67,965	40,265	27,701	.....	.....
	1 " " '06	59,058	31,777	27,281	.....	.....
	6 " " '07	338,687	205,182	133,505	.....	.....
	6 " " '06	289,277	173,160	116,117	.....	.....
COLUMBUS, GA. Columbus Elec. Co.	1 m., June, '07	30,334	*18,794	11,540	10,100	1,440
	1 " " '06	24,979	*13,657	11,322	8,762	2,560
	12 " " '07	334,704	*187,979	146,725	112,507	34,218
DALLAS, TEX. Dallas Elec. Corp'n.	1 m., June, '07	91,926	*65,514	26,412	18,731	7,681
	1 " " '06	88,821	*54,842	33,979	15,292	18,688
	12 " " '07	1,062,056	*780,345	281,711	198,472	83,239
	12 " " '06	1,008,363	*623,627	384,736	183,387	201,349
DETROIT, MICH Detroit, Jackson & Chicago Ry.	1 m., July, '07	38,586	*29,688	8,898	15,012	†6,114
	6 " " '07	203,212	*161,285	41,927	90,075	†48,148
‡Detroit United Ry. Co.	1 m., July, '07	668,551	*383,624	284,927	117,009	167,918
	1 " " '06	603,182	*337,576	265,606	105,463	160,143
	7 " " '07	3,791,254	*2,329,767	1,461,487	796,012	665,475
	7 " " '06	3,381,061	*2,015,646	1,365,415	710,206	655,209
DULUTH, MINN. Duluth St. Ry. Co.	1 m., June, '07	72,816	34,712	38,104	17,925	20,179
	1 " " '06	66,999	29,266	37,734	17,534	20,200
	6 " " '07	386,121	201,052	185,068	105,932	79,137
	6 " " '06	356,238	191,475	164,762	105,053	59,709
EAST ST. LOUIS, ILL. East St. Louis & Suburban Co.	1 m., June, '07	183,067	93,754	89,313	.....	.....
	1 " " '06	163,019	81,583	81,436	.....	.....
	6 " " '07	997,817	542,952	454,865	.....	.....
	6 " " '06	896,157	457,451	438,706	.....	.....
EL PASO TEX. El Paso Cos.	1 m., June, '07	41,030	*30,002	11,028	5,214	5,815
	1 " " '06	32,183	*20,334	11,848	3,797	8,052
	12 " " '07	444,507	*339,129	105,378	58,268	52,110
	12 " " '06	332,572	*221,608	110,964	45,347	65,617
FT. WAYNE, IND. Ft. Wayne & Wabash Valley Tr. Co.	1 m., June, '07	107,307	64,237	43,070	.....	.....
	1 " " '06	93,648	57,285	36,363	.....	.....
	6 " " '07	569,277	348,995	220,282	.....	.....
	6 " " '06	491,886	307,090	184,796	.....	.....
FT. WORTH, TEX. Northern Texas Tr. Co.	1 m., June, '07	92,588	*53,683	38,905	10,624	28,281
	1 " " '06	73,032	*45,398	27,634	9,942	17,692
	12 " " '07	967,105	*607,526	359,579	122,020	237,559
	12 " " '06	735,736	*454,365	281,371	119,275	162,096
GALVESTON, TEX. Galveston Elec. Co.	1 m., June, '07	36,521	*19,501	17,020	4,167	12,853
	1 " " '06	32,165	*16,411	15,754	4,167	11,587
	12 " " '07	345,980	*206,049	139,931	50,000	89,931
	12 " " '06	286,613	*179,595	107,018	50,000	57,018
HOUGHTON, MICH. Houghton County St. Ry. Co.	1 m., June, '07	22,438	*12,063	10,375	3,945	6,430
	1 " " '06	20,152	*11,752	8,400	3,918	4,482
	12 " " '07	243,320	*151,121	92,199	47,168	45,031
	12 " " '06	211,196	*144,624	66,572	45,945	20,627
HOUSTON, TEX. Houston Electric Co.	1 m., June, '07	59,076	*39,167	19,909	8,417	11,492
	1 " " '06	51,158	*30,138	21,021	7,692	13,329
	12 " " '07	634,522	*413,231	221,291	95,910	125,380
	12 " " '06	558,301	*346,646	211,655	100,366	111,289
KANSAS CITY, MO. Kansas City Ry. & Lt. Co.	1 m., June, '07	515,816	281,275	234,541	153,228	81,312
	1 " " '06	457,788	245,102	212,686	142,026	70,660
LEXINGTON, KY. Lexington & Interurban Rys. Co.	1 m., June, '07	45,475	30,964	14,511	.....	.....
	1 " " '06	47,508	30,114	17,394	.....	.....
	6 " " '07	249,695	169,529	80,166	.....	.....
	6 " " '06	231,641	163,451	68,190	.....	.....
MILWAUKEE, WIS. Milwaukee Elec. Ry. & Lt. Co.	1 m., July, '07	337,649	166,125	171,524	103,158	68,366
	1 " " '06	305,681	146,817	158,864	90,191	68,673
	7 " " '07	2,199,576	1,102,428	1,097,148	671,851	425,297
	7 " " '06	1,977,341	987,029	990,312	604,596	385,716
Milwaukee Lt. Ht. & Tr. Co.	1 m., July, '07	97,179	35,488	61,692	60,020	1,672
	1 " " '06	81,679	26,784	54,895	30,709	24,186
	7 " " '07	441,715	194,199	247,516	269,942	†22,425
	7 " " '06	374,920	149,830	225,090	176,671	48,419
MINNEAPOLIS, MINN. Twin City R. T. Co.	1 m., June, '07	530,741	248,769	281,972	115,142	166,830
	1 " " '06	484,590	215,544	269,046	110,592	158,455
	6 " " '07	2,848,614	1,397,142	1,451,472	691,317	760,156
	6 " " '06	2,554,609	1,214,382	1,340,226	660,017	680,210
MONTREAL, CAN. Montreal St. Ry. Co.	1 m., July, '07	339,756	175,947	163,810	67,733	96,077
	1 " " '06	300,885	161,161	139,723	55,802	83,922
	10 " " '07	2,834,644	1,761,545	1,073,099	457,347	615,752
	10 " " '06	2,494,670	1,528,354	966,316	374,810	591,505
NEW ORLEANS, LA. New Orleans Ry. & Lt. Co.	1 m., June, '07	492,653	279,676	212,977	167,044	45,933
	1 " " '06	446,278	261,319	184,959	155,124	29,835
	6 " " '07	3,066,155	1,577,171	1,488,984	1,000,562	488,422
	6 " " '06	2,899,088	1,540,468	1,358,620	916,286	442,334
NORFOLK, VA. Norfolk & Portsmouth Tr. Co.	1 m., June, '07	254,247	149,235	105,012	.....	.....
	1 " " '06	150,750	102,872	47,978	.....	.....
	6 " " '07	1,100,180	700,482	399,698	.....	.....
	6 " " '06	788,214	520,048	268,166	.....	.....
PEEKSKILL, N. Y. Peekskill Lt. & R. R. Co	1 m., June, '07	16,513	7,990	8,523	.....	.....
	1 " " '06	15,219	7,065	8,154	.....	.....
	6 " " '07	75,824	43,714	32,110	.....	.....
	6 " " '06	65,976	35,984	29,992	.....	.....
PHILADELPHIA, PA. American Rys. Co.	1 m., July, '07	302,034	.....	.....	.....	.....
	1 " " '06	276,275	.....	.....	.....	.....
PLYMOUTH, MASS. Brockton & Plymouth St. Ry. Co.	1 m., June, '07	12,360	*8,456	3,903	1,800	2,104
	1 " " '06	10,808	*6,477	4,331	1,832	2,499
	12 " " '07	116,420	*75,033	41,387	21,640	19,747
	12 " " '06	104,040	*70,884	33,156	21,540	11,616
ROCHESTER, N. Y. Rochester Ry. Co.	3 m., June, '07	642,997	385,554	257,443	146,431	111,012
	3 " " '06	551,639	332,152	219,487	99,761	119,726
	12 " " '07	2,451,698	1,540,928	910,770	461,593	449,177
	12 " " '06	2,093,383	1,204,904	888,479	381,559	506,920
ST. LOUIS, MO. United Railways Co. of St. Louis	1 m., July, '07	941,878	*573,936	367,942	232,511	135,431
	1 " " '06	901,554	*565,578	335,976	231,850	104,126
	7 " " '07	6,229,490	*4,099,972	2,129,518	1,618,820	510,698
	7 " " '06	5,851,186	*3,686,358	2,164,828	1,622,614	542,214
SAVANNAH, GA. Savannah Electric Co.	1 m., June, '07	51,836	*33,399	18,437	11,948	6,489
	1 " " '06	58,224	*30,165	28,059	11,263	16,797
	12 " " '07	590,843	*384,984	205,859	139,035	66,823
	12 " " '06	614,780	*369,689	245,091	130,343	114,749
TACOMA, WASH. Puget Sound El. Ry. Co.	1 m., June, '07	147,199	*88,263	58,936	31,977	26,959
	1 " " '06	116,794	*78,629	38,165	24,763	13,402