Street Railway Journal

VOL. XXII. NEW YORK, SATURDAY, AUGUST 22, 1903. No. 8

PUBLISHED EVERY SATURDAY BY THE
McGRAW PUBLISHING COMPANY

MAIN OFFICE:
NEW YORK, ENGINEERING BUILDING, 114 LIBERTY STREET.

BRANCH OFFICES:
Chicago: Monadnock Block.
Philadelphia: 929 Chestnut Street.
Cleveland: Cuyahoga Building.
London: Hastings House, Norfolk Street, Strand.

Cable Address, "Stryjourn, New York,"—Lieber's Code used.

TERMS OF SUBSCRIPTION

In the United States, Canada and Mexico.....$4.00 per annum
Single copies, first issue of each month, 25 cents; other issues, 10 cents.

To all Countries outside of the United States, Canada and Mexico.... $6.00 £1-5s M 25 Fr. 31

Single copies, first issue of each month, 40 cents; other issues, 15 cents.
Subscriptions payable in advance, by check or money order. Remittances for foreign subscriptions may be made through our European office.

Entered as second-class matter at the New York Post Office.

EDITORIAL NOTICE

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

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

Address all communications to

THE STREET RAILWAY JOURNAL,
114 Liberty Street, New York.

Indiana and Ohio Joined

Last week witnessed the completion of the last connecting link between the interurban electric railway network centering at Indianapolis and that of Southern Ohio. The completion of this bit of track between Richmond, Ind., and Eaton, Ohio, by the Dayton & Western Railway Company has made possible the operation of through interurban cars between the capitals of the two greatest interurban railway States of the Union.

The distance from Indianapolis to Columbus is 188 miles, which makes possible the longest trolley ride in one general direction now available in the United States. To this, however, might be added the distance from Columbus east to Newark, 38 miles, and the distance from Indianapolis, southwest to Martinsville, 30 miles, which would make a trip of 256 miles in the same general direction. To those who have been actively engaged in interurban construction in Indiana and Ohio this joining together of two great networks, one of Central Indiana and the other of Southern Ohio, has been worked up to so gradually that it seems but a natural outcome for all this activity. To those who have not followed the interurban development of the past five years, the map showing the networks which are connected, which accompanies the article on the opening of the interstate connection, elsewhere in this issue, is a revelation. Our interurban friends in Ohio, however, promise that soon there will be important additions to the through east and west line already established, and that before many months a ride by electric car from Indianapolis to Pittsburg will be possible. It is intended soon to give a sleeping car service over the new interstate route from Columbus to Indianapolis. This is one of those routes regarding which we have previously spoken, where a night's journey on an electric sleeping car would be far preferable to the interruption of a day's business to make the journey on a steam railroad. It is on such routes as this that interurban sleeping car service should pay.

Shocks from High-Voltage Locomotives

Electric locomotives or cars on which voltages more dangerous to life than the common 600-volt direct-current are few as yet, but with the introduction of alternating current their number will increase; and it is in order to call attention to one element of danger in their operation which cannot be too carefully guarded against. It is a danger for which prevention is easy, but is nevertheless a real one, and has already resulted in at least one serious accident in this country. We refer to the possibility that a locomotive may run onto a portion of track covered with sand or dirt, so that there is a partial insulation between the wheels and rails. In such a case, if the locomotive is running on a grounded circuit, using the rails as a return, there is an excellent chance for employees to receive serious shocks in attempting to board the locomotive, because there is likely to be a dangerous voltage between the locomotive frame and ground. Shocks from this cause have not been unknown in street railway practice, but the voltage is usually not dangerous to life on a street railway system, and there is considerable insulating wood in the make-up of a car. On an electric locomotive, using high-tension electric current, and having a steel frame, however, a shock of this kind is almost certain to be attended with disagreeable consequences. Although the possibilities of a shock from this cause are apparent, consideration is not usually given to the danger, so that we feel justified in uttering this warning. One obvious remedy is to omit the sand boxes from such a locomotive's equipment, and furthermore, if the locomotive is ever to operate on dirty rails, it should be equipped with a set of brushes for brushing the rail in advance of the wheel.

Overhauling According to Mileage

There are several methods in vogue in electric railway repair shops for determining the frequency with which the trucks and motors under a given car shall be entirely overhauled. One method is to do this at certain regular intervals of time, varying from one to six months or a year, according to the severity of the service, and the thoroughness of the overhauling. Another plan is to keep watch of the armature bearings and other wearing parts of an equipment, and overhaul the equipment only when the wear on the bearings makes it necessary. The most common way is to see that all the bearings on an equipment are in such condition when the equipment is sent out of the shop that they will outlast the armature bearings. The time that the equipment can run is then determined by the amount that the armature bearings can wear without letting the armature rub on the pole pieces. The clearance between the arma-

ture and the pole pieces is kept track of by motor inspectors, and whenever this becomes dangerously small the equipment is taken out for overhauling, as it is necessary to renew armature bearings, and other parts are renewed, if necessary, at the same time. A third method is to overhaul motors and trucks after they have made a given mileage. In such cases, of course, it is necessary for the shop foreman or master mechanic to know from day to day just what mileage each car has made since it was overhauled. Such records are not difficult to keep, by the thorough systems in use on some roads, though they would be expensive on roads where very few records are kept.

Of the three methods, the two latter seem by all means the most logical. Of course, where a car is overhauled according to the time it has been out of the shop, it is assumed that the mileage of all cars is approximately the same, which may or may not be correct. Such a system, unless it takes account of conditions, in character of service and equipment, of course, might lead to either unnecessary expenditure for overhauling or to neglect; but it is only fair to assume that the master mechanic who overhauls equipment by the mileage system takes all these things into account. It is also fair to assume that he will make extensive trials of the amount of mileage an equipment can make safely before establishing the standard mileage which would determine the frequency with which cars should be over hauled. Overhauling, according to the observed wear on bearings or on other parts, is theoretically the most perfect of the three methods, because by it the full amount of safe wear is obtained from armature bearings, and there is no bringing in of cars for overhauling sooner than is necessary. The only practical flaw in this method is that inspectors may not always notice defects or unsafe amount of wear. With trucks brought in after a certain mileage, or after a certain period of time, such defects would be remedied in the overhauling, whether they were noticed by the inspectors or not. The relative advantages of these methods might well be made the grounds for an extended discussion among master mechanics and shop men.

Limited Service on Interurban Lines

Various kinds of limited service are being given by interurban lines, and it is not always possible for a passenger to enthuse over it after a shake-up and shake-down experience with it, but it is difficult to refrain from enthusiasm over the magnificent high-speed service that is being given by the Indiana Union Traction Company between Muncie and Indianapolis. It is a revelation to the uninitiated to find an interurban electric road that maintains its roadbed and other equipment in such shape as to permit speeds of from 50 miles to 60 miles per hour being maintained continuously over long stretches, and even the experienced interurban railway man knows that the construction and the traffic conditions which make such things possible are as yet few in interurban practice. To the traveling man, who is used to a rain of soot and cinders when the weather is such as to require open windows on fast steam trains, the possibility of being carried over the country at the same speed and smoothness by this limited electric service as on the limited steam trains, and without the dirt, comes as a welcome relief. The traveling man can only say: "Let it be extended until it covers the whole country."

It is sometimes considered by railway managers, both steam and electric, that the fast limited trains are justified mainly from an advertising standpoint, and do not pay from a purely operating standpoint. There is, of course, such a thing as overdoing the fast limited car business on an interurban line. There are very many lines where there is really no object in such a service; but on the whole, limited service is likely to grow more and more common. To give it in a satisfactory manner requires an excellence of roadbed, equipment and operating organization not found everywhere. In fact, it is found at present, as before said, on only a few roads. The place for limited service is naturally between the larger towns, and the experience in Indiana would seem to indicate that there are enough traveling men and other passengers willing to pay a higher rate of fare for limited service, so that the service is justified from other than an advertising standpoint. To one who is watching the development of the interurban road in Indiana and Ohio it is evident that the limited service that is being given by some of the companies in these States is a stepping-stone to an entirely different class of service from that which interurbans were originally built to give; namely, high-speed through service between the larger towns. Heretofore the interurban line has been essentially a line for local traffic. Even if equipped to make high speed between stops, the stops, either for passengers, or on account of the physical restrictions, have been too frequent to permit of a high-schedule speed. The Indiana Union Traction Company, in conducting the service just referred to, for nearly two years past has been fortunate and foresighted in having a track over which, by efficient operating methods, it could run both local and high-speed limited trains. It is thus able to cater to the business, both between the larger and the smaller towns, and is able to secure practically all of the travel, both for the longer and the shorter distances covered by its lines. This could not have been done if the road had been planned, as are many of the Eastern trolley lines, with a single track, and for local service only. This fact is one which might profitably be borne in mind by some of these roads, that traffic will come to the fast line, if the line is there to take it.

It now looks as if electric traction was to take another step, and offer frequent high-speed service between cities located over 75 miles apart, something which has not heretofore been attempted, but which has been discussed in a somewhat vague and indefinite way. The Indianapolis & Cincinnati Traction Company, if its present plans are carried out, will probably be one of the first to try this experiment. This line, which is being built from Indianapolis to Cincinnati by way of Rushville, Ind., has been laid out with the intention of making it essentially a high-speed road, catering to through business between those two cities. The main idea has been to build a road to handle the through business. There has been considerable speculation as to the amount of business a high-speed electric line between the larger Eastern cities, especially between New York and Philadelphia, would secure; but the present appearances are that the first experiment of this kind will be tried between some of the smaller Western cities.

The Passing of the Horse

It is not easy to realize the thoroughness of the change from animal to mechanical traction without resort to the gloomy pathway of statistics. Of about 23,000 miles of tramway track in the United States, only a minute fraction over one per cent is now operated by horses or by the long-eared, mighty-heeled mule. A horse railroad seems an anachronism, a survival from a geologic period long past, chiefly known by fossil remnants cast up along the shores of back alleys, wherein prehistoric frankfurters are cached. And yet the remains of animal traction are even more singular in their nature and distribution than the catastrophe that has swallowed up most of the species. To be precise, there were, as reported at last accounts, 259.1

miles of track in the entire country operated by animal traction. Of that amount, the proud Empire State can boast nearly one-half, 115.17 miles, to be exact, in so distinguished a case. Of the other States, California is a bad second with 42.37 miles, and Kansas, butt of the silk-stockinged politicians, is third on the list with a beggarly 21.63 miles. The rest are scattering—very scattering. Between the three States just mentioned there is so complete and grinding a monopoly of out-of-date equipment that less than 80 miles is left for the rest of the country, and of that, 12 miles is in far-away Hawaii. There are a few small horse (or mule) roads in the South and Southwest, but in the Middle West and the East they have been pretty thoroughly exterminated. New England has but a single small specimen left, which ought to be bought up and preserved by some of the patriotic orders to show posterity the methods of the ancients.

Strange to say, the last refuge of animal traction is found in cities. Boston cherished a mangy mile or so for several years for the exclusive patronage of the exclusive Back Bay, and then the tracks were taken up and the street left to somnolent decay. But New York is the home of the only considerable band of horse roads that remains. The metropolis has nearly all of the quantity credited to the State, more than California combined with Kansas and a few Southern States thrown in for good measure. The old fogy who, in his declining years, longs again to scent the mildewed straw of his boyhood conveyance must come to New York. The antiquarian, hoping to find a museum piece for his collection of out-worn vehicles, must come to New York. New Yorkers howl for rapid transit—and ride to the ferry in horse cars; they turn up the nose of scorn at the pretensions of the Chicago Three-Million Club, and harbor five times as much horse railroad as the whole of Illinois. It is indeed curious that local conditions and local prejudices have so marked the metropolis as a conserver of curios. Some of the down-town cars are well worthy a place beside the ancient bronze chariot recently acquired by the Metropolitan Museum of Art. There are specimens in that collection of far less well-authenticated antiquity. New York, in its determination not to harbor the trolley, has fostered some curious freaks; it has been the scene of more than one fruitless experiment in mechanical traction, but its hundred-odd miles of horse car track is a strange anachronism.

Joking aside, it is a very singular thing that so great a proportion of the remaining horse railroad should exist in a single city, and that the second largest in the world, where the density of traffic is so great as to justify almost any expenditure. One is not surprised at finding little one-mule lines in small Southern towns, where travel, at its best, can hardly keep one car in paint and wheel grease, but it is a shock to think of conditions nearer home. Yet this condition cannot long continue, and a few years at the most will see the last horse car landed in the scrap heap and the last horse out of its weather-beaten traces. If our friends of the automobile are right in their predictions, the horse will soon, too, be freed from use in pleasure vehicles, and from the business traffic, at least, of the cities. If the present speeding of Red Devils continues and increases, it is safe, also, to predict that no one will drive a horse, even in the country, unless he has to, and then only at dead of night, or over precipitous mountain roads that no automobile dare attempt. Even now there are large districts where pleasure driving is practically abandoned, and the residents cut across lots to get running water between themselves and the pursuers. With all these modern improvements, what is to become of our old friend, the horse? Is he to be kept exclusively for horse shows, in which he even now is only a subsidiary feature, for hunting the ferocious anise-seed bag, and for supporting, in their wobbling through space, the gold-laced and the sabred minions of the National Guard? There are, in fact, ribald and mendacious scoffers who have insinuated that the most important function of the metropolitan horse-car lines is to furnish mounts for certain organizations which patriotism forbids us to mention. Or, possibly, the French savant who has been studying dwarf horses may bring the breed to so convenient a size that we may see fair automobilists in the Park with lap-horses. But, however this may be, we live in hope that the horses now enslaved before the bob-tail cars of our down-town lines may soon be released from their antediluvian burdens, and join the great majority of the equine kind.

Automobile Registration

The registration, numbering and licensing of automobiles is now in active process in Massachusetts at the hands of the State Highway Commission. We believe that this is a most commendable step, and that the action of Massachusetts and other States which require owners and drivers of motor vehicles to qualify as to their capacity for running such conveyance is bound to result in greater security to life and property than has previously been enjoyed.

The use of motor vehicles by irresponsible persons lies at the bottom of many a collision and runaway. In fact, we are disposed to regard the automobile as a far greater sinner in this respect than the often unjustly condemned trolley car, and welcome the placing of proper restrictions upon the use of electric, steam or gasolene carriages operated by ignorant or careless drivers. Certainly if the safe operation of modern electric cars over a prescribed and limited path demands a trained and authorized man at the controller, there can be no doubt that the automobile chauffeur should all the more be required to show good cause for being allowed to scorch over the width of roads and highways at his own sweet will.

Cases are rare when an electric car figuring in an accident escapes identification. It is equally important that all motor-driven vehicles be marked with a plain number, so that the occupants can be later made to give an account of themselves in case the instinct to run away overcomes their courage to face the consequences of a casualty. Chauffeurs who keep within the law have nothing to fear from registration, and much to enjoy in the lessened chances of being made the scapegoats of others' iniquities through instances of mistaken identity. The frequency of arrests and fines for over-speeding which are at present swelling the coffers of the treasurers of the towns throughout the country which have speed regulations, is pretty good evidence that a registration law is badly needed, and there is ground for belief that the unjust complaints which have so often been unreasonably made against the trolley car will be lessened in number when the full force of the automobile regulations is felt. At the time of the teamsters' strike in Boston last year the very small part which street cars play in the traffic congestion of that city was mentioned in our columns, and if we apply the same reasoning to the highways, there can be no doubt that the better control of automobiles on the public roads will result in noticeably improved operating conditions on both high and moderate-speed electric railways. We do not begrudge the chauffeur his place on the highway, but we do object to the trolley's bearing the brunt of that unfair criticism which rightfully belongs to the reckless operator of the Purple Terrors that have banished security from many of the roads and streets of this country.

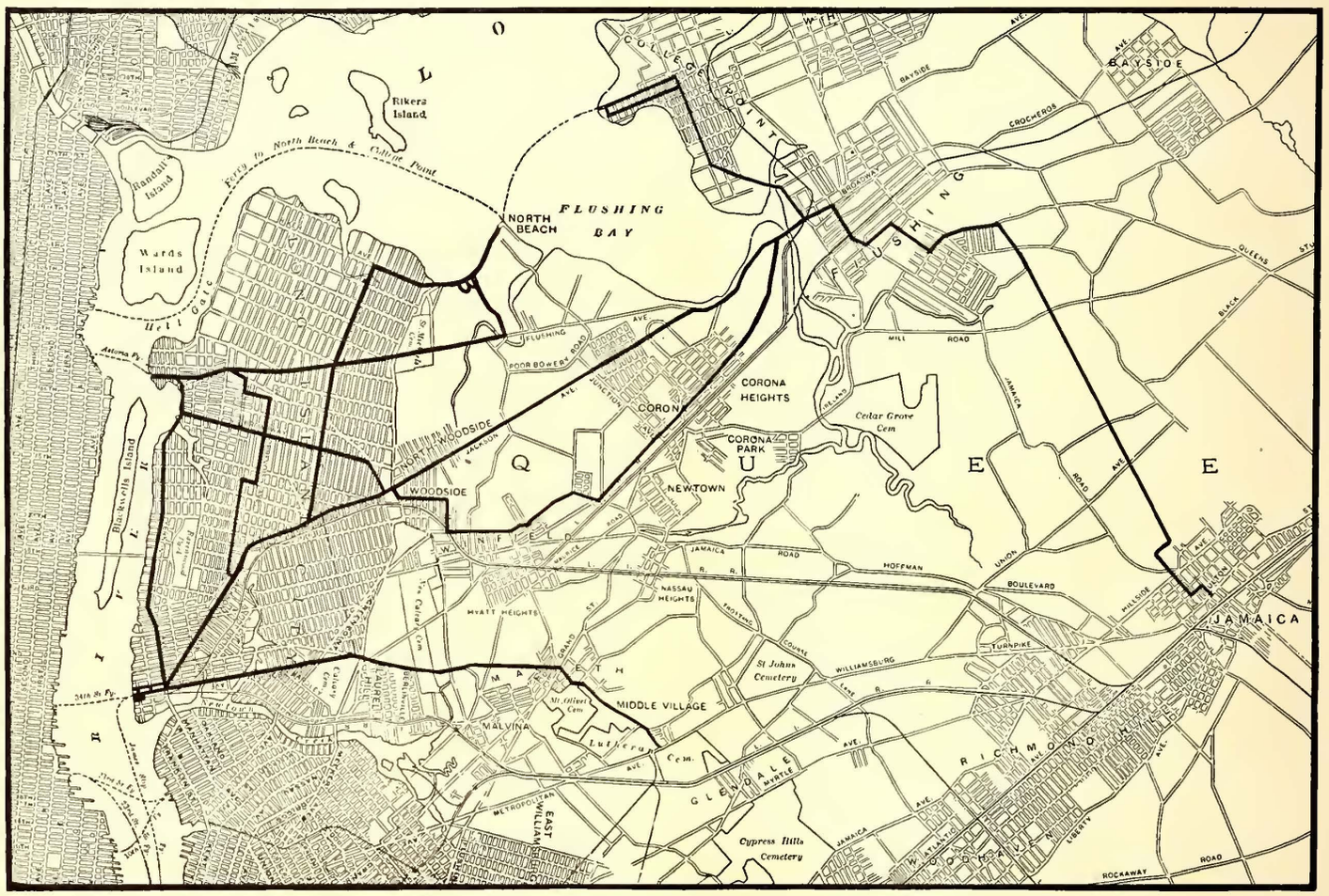
RAILWAY DEVELOPMENT IN QUEENS COUNTY

The recent transfer of ownership of the control of the New York & Queens County Railway, as announced in these pages, has called attention to the large system which is separated from Manhattan Borough only by the East River and from Brooklyn only by Newtown Creek. Whether any large interests now identified with steam or electric railroading are associated with the United States Mortgage & Trust Company in its purchase of the property, as was originally surmised, has not been announced, but the fact makes an examination of the territory served by the company at present, of interest.

The district which now comprises the Borough of Queens in the city of Greater New York contains an area of 127.69 sq. miles, or 41.6 per cent of the total area of Greater New York, while its population in 1900 was only 153,000, or 4.7 per cent of the total population of the city. The borough is in many respects eminently situated for residential purposes, a large part of it being directly across the East River from Manhattan Island, from Thirty-Fourth Street to Ninety-Second Street. The soil is sandy, and the situation between the Atlantic Ocean and Long Island Sound insures an equitable climate, with cool summers and moderate winters. It was the belief of many of the most astute real estate operators fifty years or seventy years ago that land in the territory now situated in Queens Borough would soon become very valuable and be directly in the line of future residential growth. Following out this idea a number of capitalists purchased large tracts in that region, among them the Astors, who established the town of Astoria, and the Steinways, who gave the name of Steinway to the territory purchased by them. It was believed at that time that the greater part of travel between down-town New York and its residential districts would be by steamboats, which had then been recently developed, and as Queens has an extended water frontage the transportation facilities by water are exceptionally good. But with the invention of the steam locomotive and the consequent rapid development of surface transportation methods during the following decades, the East River proved to be a barrier instead of a highway. The elevated railroads in New York, probably, more than any other one factor, or more than all the others together, directed the trend of population in another direction, viz., directly north on Manhattan Island. The result is that the early real estate scheme of the last century failed dismally, and the population of Queens Borough, although showing a remarkable recent growth, has developed much more slowly than that of other parts of the present city of New York.

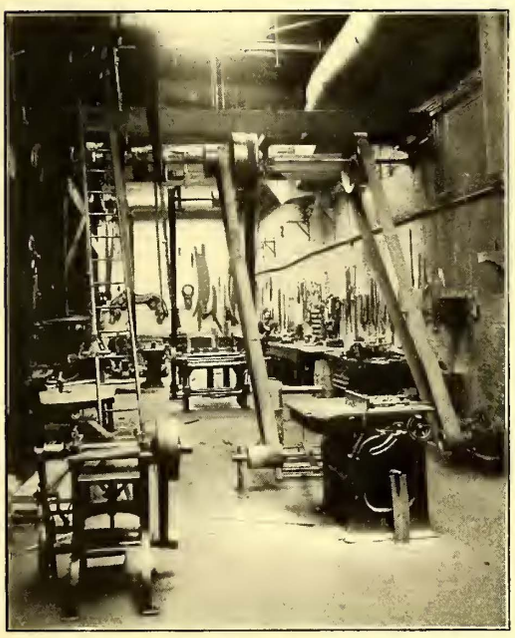
The achievement of the engineering skill, which in the elevated railways did so much for Harlem during the middle of the last century in the way of land transportation, now, however, promises to exercise an equal transformation in the Borough of Queens. As stated in the articles by Mr. Wheatly during the early part of this year on the passenger traffic problem of Greater New York, two important physical connections are under way between Long Island City and Manhattan Borough. One of these is the four-track tunnel which is being built by the Pennsylvania Railroad between Thirty-First Street, Thirty-Second Street, Thirty-Third Street and Thirty-Fourth Street in New York and Long Island City. As this tunnel will connect Long Island City with the Rapid Transit subway in New York, it will make this suburb as easy of access as any section of the upper part of Manhattan Borough.

The other connection is the Blackwell's Island Bridge, which will extend from the corner of Second Avenue and Fifty-Ninth Street to a point near Jane Street and Jackson Boulevard in Long Island City. This is very near the junction of what is known as the Dutch Kills line, and the Jackson Avenue line of the New York & Queens County Railway.

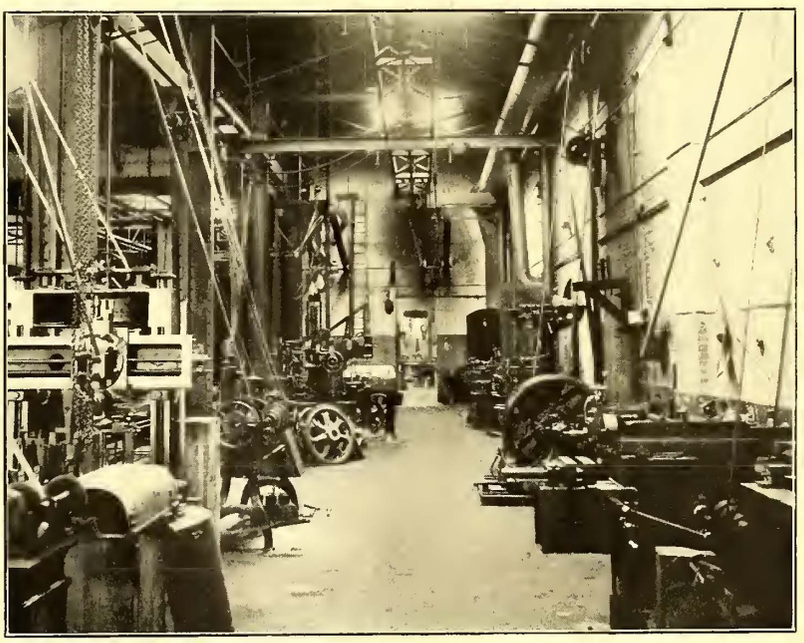


MAP SHOWING SYSTEM OF THE NEW YORK & QUEENS COUNTY RAILWAY

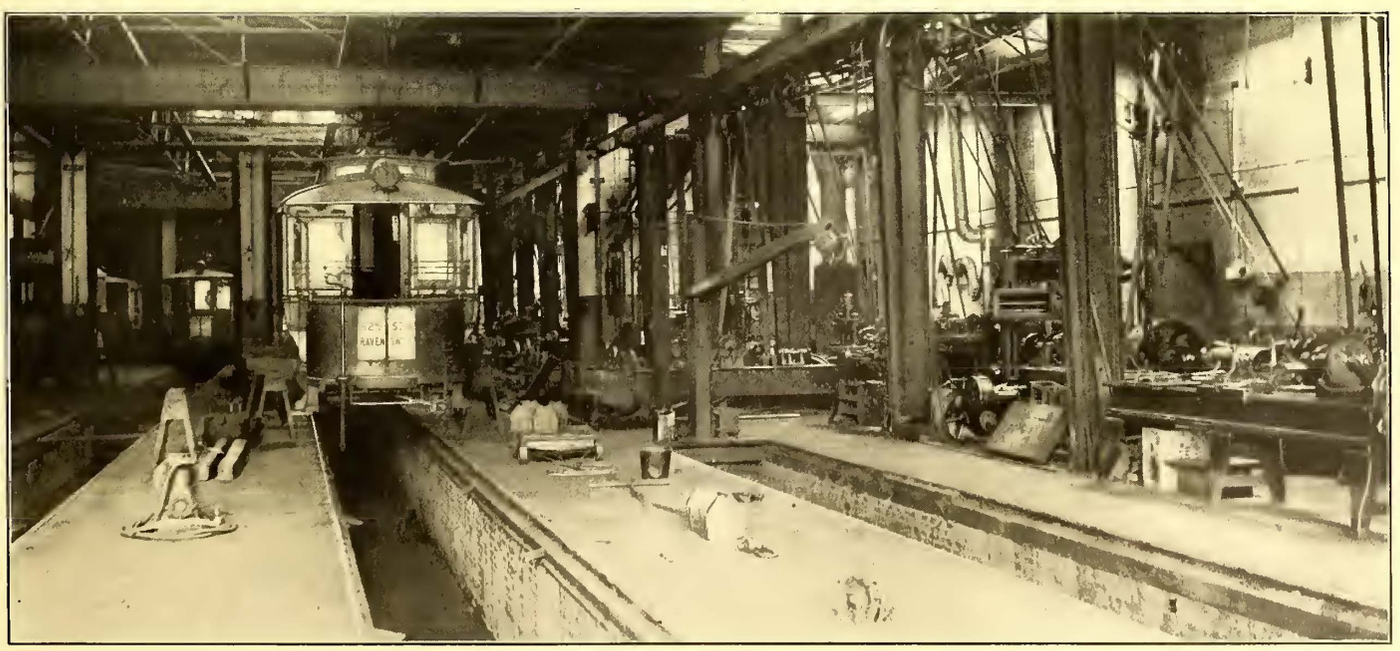
EXTERIOR OF CAR HOUSE AND REPAIR SHOPS AT WOODSIDE



THE WOOD WORKING SHOP

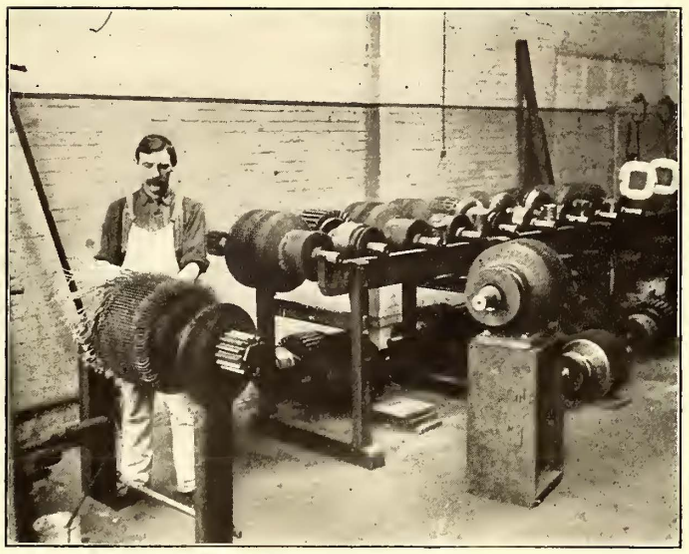


VIEW IN THE MACHINE SHOP

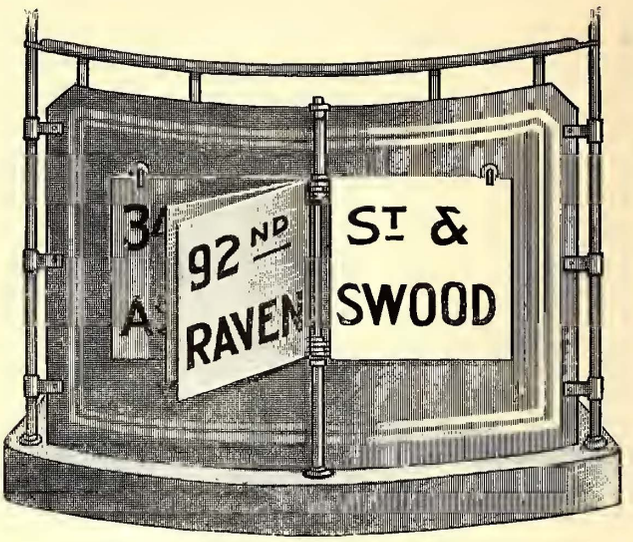


GENERAL VIEW OF THE REPAIR SHOP AT WOODSIDE CAR HOUSE

The foundations for this bridge have already been commenced, and it will have four tracks for trolley cars and two tracks for elevated trains, making an estimated capacity of 700 trolley cars each way per hour and sixty elevated trains. On a basis of fifty passengers per trolley car and 480 passengers per elevated train, the total capacity of the bridge transportation will be 63,800 passengers per hour in each direction. This bridge will connect directly with the elevated system in New York, so that it will bring the vast region at this eastern terminus considerably nearer in point of time than the present Borough of the Bronx.



ARMATURE WINDING DEPARTMENT



CHANGEABLE DESTINATION SIGN

While it is impossible that a passenger movement of the capacity indicated by the figures above should develop within probably several decades after the completion of this means of transportation, the figures published above show the opportunities possessed by the Borough of Queens and the importance which the street railway transportation system of that borough will assume within the next ten years.

CARS WAITING AT TERMINUS OF THIRTY-FOURTH STREET FERRY FROM MANHATTAN

Practically all the street railway lines in this district are now owned and operated by the New York & Queens County Railway Company, an organization which is entirely separate from either of its big neighbors, the Brooklyn Rapid Transit Company or the Metropolitan Street Railway Company. The company was chartered in 1896 as a consolidation of the Steinway Railway Company, the Long Island City Railway Company, the Newtown Railway Company, the Riker Avenue Railway Company, the Long Island City & Newtown Railway Company and the Flushing & College Point Railway Company. It was owned largely in Philadelphia, until the change in ownership mentioned above. It is under the management of F. L. Fuller, formerly general manager of the United Power & Transportation Company, of Philadelphia who was appointed about six months ago. The company owns 75.47 miles of track and operates 203 motor cars. The system owned by the company is shown on page 250.

As will be seen, there are at present two main termini, one at the Astoria ferry, which connects with Ninety-Second Street, New York, and the other at the foot of Borden Avenue, where there are ferry connections to Thirty-Fourth Street and Jay Street. As there is no elevated or surface railway connection on the New York side at Ninety-Second Street, the greater part of the traffic to New York is carried to the Borden Avenue terminal. The line also runs to two or three very popular shore resorts, one at North Beach and another at College Point; serves four large cemeteries and supplies the only electric railway transportation between the New York ferries and

Long Island City, Flushing and other population centers.

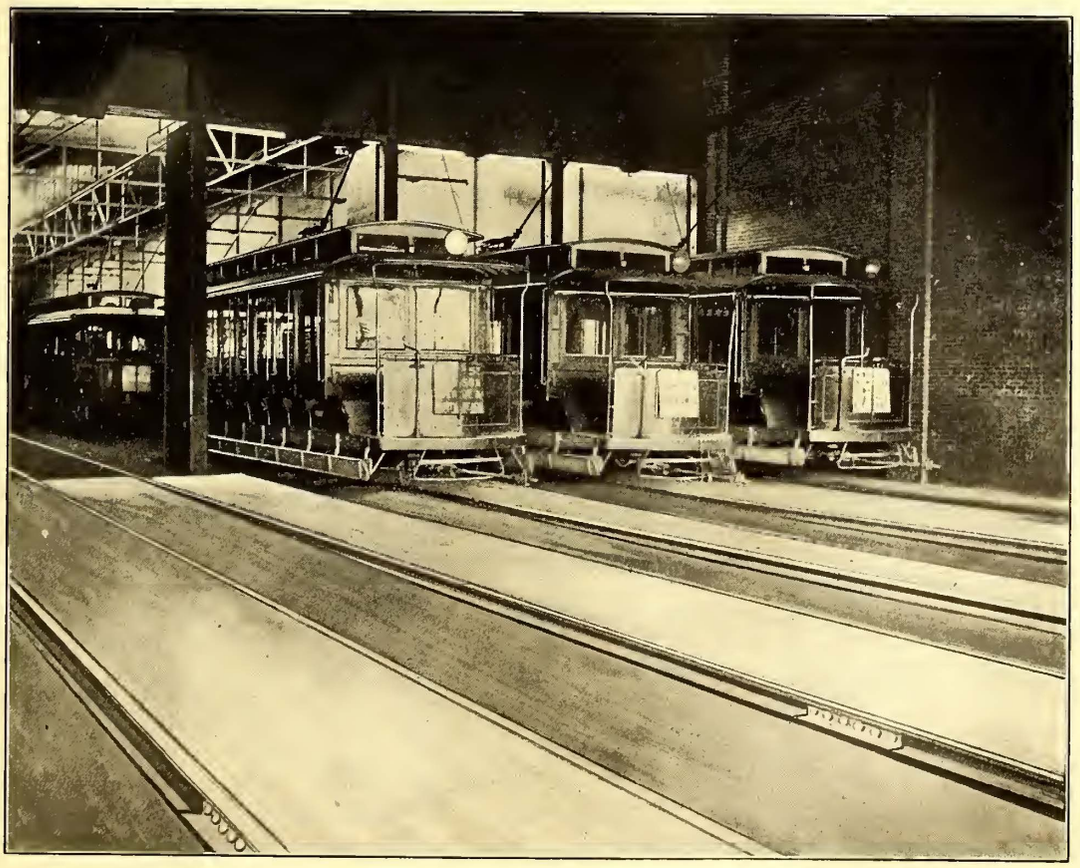
The traffic development of the New York & Queens County Railway Company is a question largely of the future, so that the purpose of this article is not to discuss this branch of the subject, which remains yet largely to be worked out, but to outline the situation in this borough and also to take up some of the interesting points from a mechanical standpoint which exist on the system.

CAR HOUSE REPAIR SHOP

Of these perhaps the most interesting, from a street railway standpoint, are the repair shops and car house at Woodside, of which a plan view is given on pages 254 and 255. The latter diagram gives the arrangement of the repair shop portion on a larger scale. Although somewhat restricted in area the repair shop has been carefully laid out to utilize all of the space available.

The building is a very handsome brick structure, about 260 ft. x 348 ft., and was erected several years ago from designs drawn up by J. H. Bickford, consulting engineer of Salem, Mass., and is in charge of C. F. Banghart, superintendent of motive power. The car house has a capacity of 200 cars, and is divided into one large storage room with ten tracks, one smaller storage room with five tracks, a wash room, the repair shop with four tracks, offices, store rooms, waiting room, etc. A spur track from the Long Island Railroad also extends along the side of the building, in which are the store rooms of the company, so that all supplies can easily be unloaded into the proper rooms provided for the purpose.

As the repair shop is not only well equipped with machine tools for the repair of cars, but as the tools are very conveniently located for the repair of cars, extending as they do along the repair tracks, a list is given below of the tools employed:



WASH ROOM AT ENTRANCE TO CAR HOUSE

LIST OF TOOLS

Carpenter Shop

1 rip and crosscut circular saw.
1 pony planer.
1 large planer.
1 16-in. drill press.
1 mortiser and borer, 5-in. stroke.
1 vertical borer, 10-in. stroke.

FRONT ELEVATION OF ENTRANCE TO CAR HOUSE

1 double spindle shaper, (spindles are 24 ins. apart).
1 hand feed jointer.
1 wood turning lathe.
1 36-in. band saw.
1 grindstone.

Machine Shop

1 20-in. lathe.
1 11-in. lathe.
1 14-in. lathe.
1 planer, width of table 30 ins., length of table 8 ft.
1 24-in. drill press.
1 12-in. drill press.
1 18-in. emery wheel.
1 power nut and bolt cutter.
1 33-in. wheel grinder.
1 100-ton hydraulic wheel press.
1 36-in. wheel boring mill.
1 hydraulic axle straightener.
1 power shear and punch.
1 pinion press.
1 grindstone.
1 babbitting apparatus and furnace.
2 10-ton hand traveling cranes in Pit Department.

Blacksmith Shop

1 forge.
1 75-lb. power hammer.
1 18-in. drill press.
1 12-in. emery grinder.

Commencing at the end of the shop nearest the entrance (page 255) the "Electrical Room" is the room in which the winding and baking of coils is performed. It contains a baking oven with work benches and racks for the finished and partly finished coils, and is separated from the rest of the building by a brick wall 12 ins. thick and with a fireproof door. Adjoining the electrical department is the machine shop, the tools of which are driven by belt and shafting from

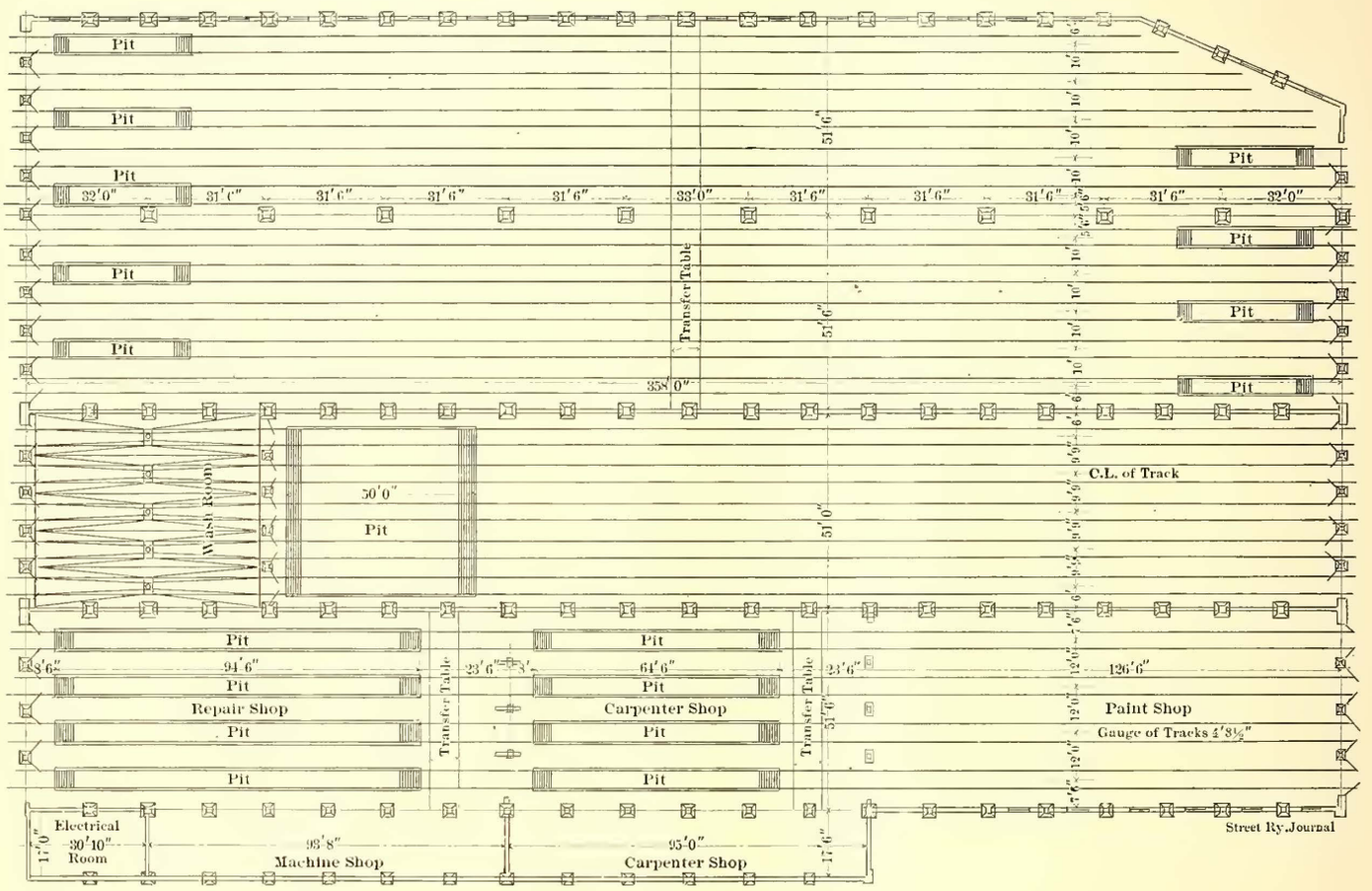
a 50-hp motor. The armatures are lifted from the cars by two traveling cranes, which command the tracks in the repair shop, or by a jib crane with an arm of 15 ft., and are then swung directly to any of the machine tools by which the work is required to be done.

Directly back of the machine shop is the carpenter shop, which contains such a complete equipment that the company has recently built in its own shops one of the most attractive parlor cars in the neighborhood of New York. The machinery in this room is driven by a separate motor of 15 hp. The carpenter shop, which also contains four tracks with pits, is separated by fireproof doors from the machine repair shop. At the end of the tracks in the carpenter shop, as well as in the repair shop, is a flush transfer table.

changed from one route to another. It is shown on page 252, and consists of several pieces of sheet iron hinged on a rod carried on the dash. As there are four or five routes in regular service this number of leaves is required for each sign. The leaves are held in position by two small gravity clips. Each line has a different characteristic color; thus, one sign (or double leaf) will be painted with red letters on a brown background, another black letters on a white background, another brown letters on a light blue background, etc.

CAR CLEANING AND INSPECTION

The cars are cleaned and inspected every night and are washed once a week. When a car is found to have run 4500 miles, notice is given to the superintendent, who regreases the journals, and after the car has run 9000 miles it is thoroughly



PLAN OF CAR HOUSE

The paint shop is located at the rear of the carpenter shop adjoining the paint, storage and oil rooms.

The car houses are heated throughout by a system of hot-air pipes, supplied from a boiler by a blower.

The rear end of the car house is equipped with a complete set of doors and entrance curves similar to those at the front end of the car house, with the entrance tracks on a grade, so that in case of fire and interruption of current the cars could be pushed by hand to the doors and then would pass out of the car house by gravity. There is also a driven-well with a motor pump for use in filling the sprinklers.

The standard equipment of the company consists of ten-bench open cars and 28-ft. closed cars with 5-ft. platforms. All the open cars are mounted on Peckham single trucks, and the closed cars on Peckham and St. Louis maximum traction trucks. The company has forty-five double-truck closed cars and thirty-eight single-truck cars, 138 open cars, five sweepers, five Taunton plows, two rotaries and three sprinklers, also a number of flat cars.

CHANGEABLE SIGN.

As the cars run on different routes an ingenious form of changeable sign has been adopted so that a car can easily be

overhauled. The force required in the inspection, repair and cleaning departments on the entire road are as follows:

34th STREET CAR DEPOT

2 day men—1 repairer, 1 cleaner.
2 night men—1 repairer, 1 cleaner.

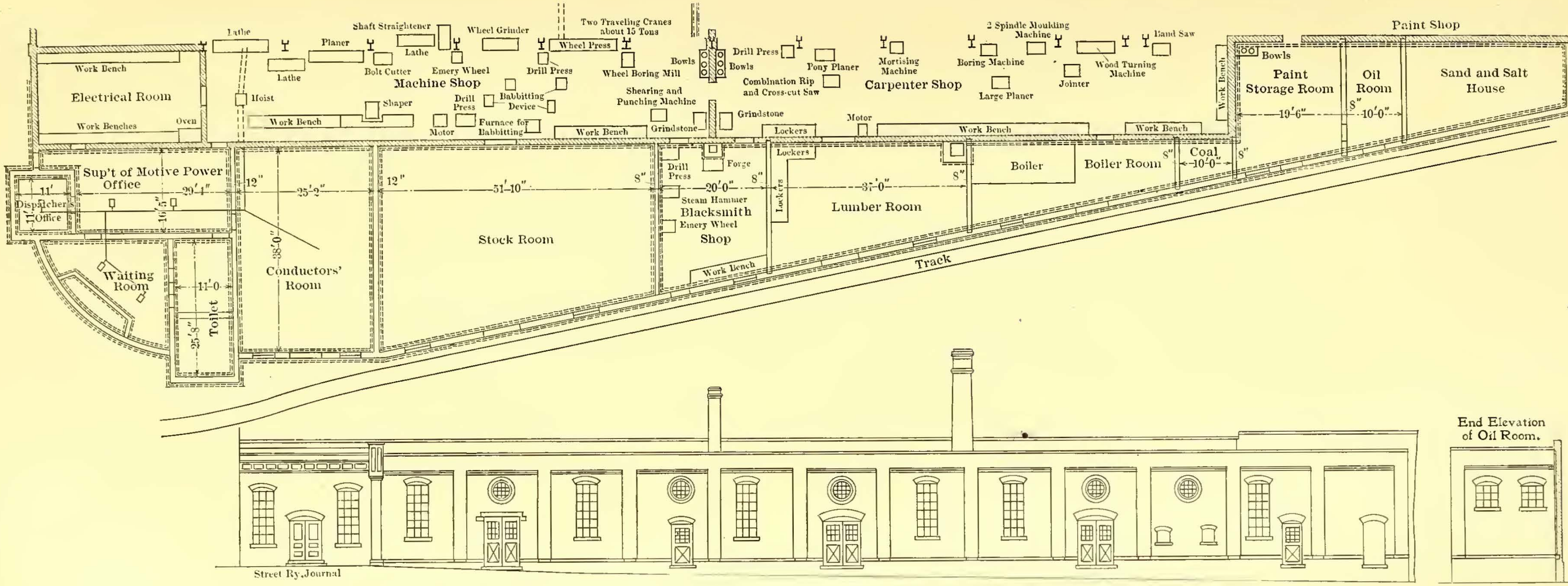
STEINWAY CAR BARN.

4 line men.
2 line men helpers.
1 day stableman.
1 night stableman.

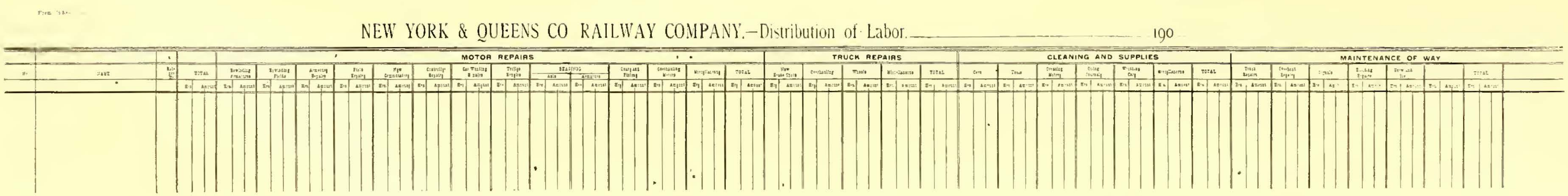
WOODSIDE CAR HOUSE

Day Force

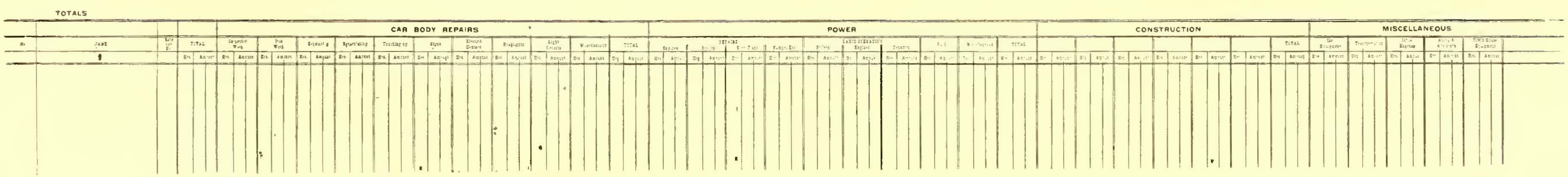
1 general foreman.
1 machinist.
1 armature winder.
1 armature repair man.
1 blacksmith.
1 blacksmith helper.
3 pit men.
3 pit men helpers.
1 boy to look after tail lights and controllers.
1 boy to pour boxes, etc.
4 car cleaners.
1 janitor.
1 storekeeper.



SIDE ELEVATION AND PLAN OF REPAIR SHOP END OF CAR HOUSE, SHOWING LOCATION OF MACHINERY



TOP OF LEFT-HAND PAGE, SHOWING HEADINGS USED IN DISTRIBUTION OF LABOR IN REPAIR AND POWER STATION SERVICE



TOP OF RIGHT-HAND PAGE, SHOWING HEADINGS USED IN DISTRIBUTION OF LABOR IN REPAIR AND POWER STATION SERVICE

1 storekeeper boy.
3 painters.
4 carpenters.

Night Force

1 fireman.
1 motor greaser.
1 brake inspector.
1 trolley wheel and pole inspector.
2 car cleaners.

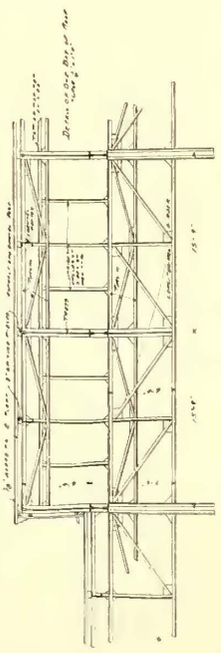
The company operates from forty cars to fifty cars on week days, and on summer Sundays its full equipment of 130 cars.

B. O. SIGNS

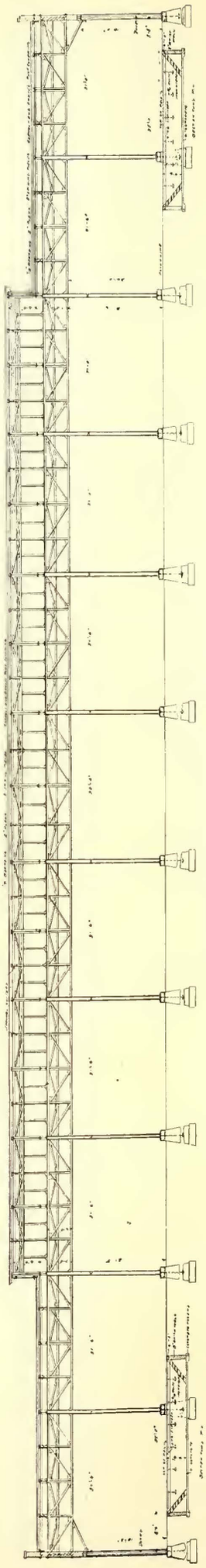
When the crew leaves a car the motorman is obliged to fill out a card similar to that shown on page 258, and popularly known as a B. O. car. On this he checks off any part of the equipment which is in bad order, and hangs the card on a hook in the car. If the equipment is "o. k." the card is so marked. When a bad order card is found in a car the inspector immediately makes an examination, and if the apparatus is defective has it repaired. He then signs the card and hands it in at the office of the superintendent of motive power. Under no circumstances is a crew allowed to take out a car with a "B. O." sign. The advantages of the practice are numerous. It locates the responsible person in case of defective apparatus and prevents a motorman from claiming that a car was in bad order when it left the car house, a common excuse in cases of accident.

REPORTS

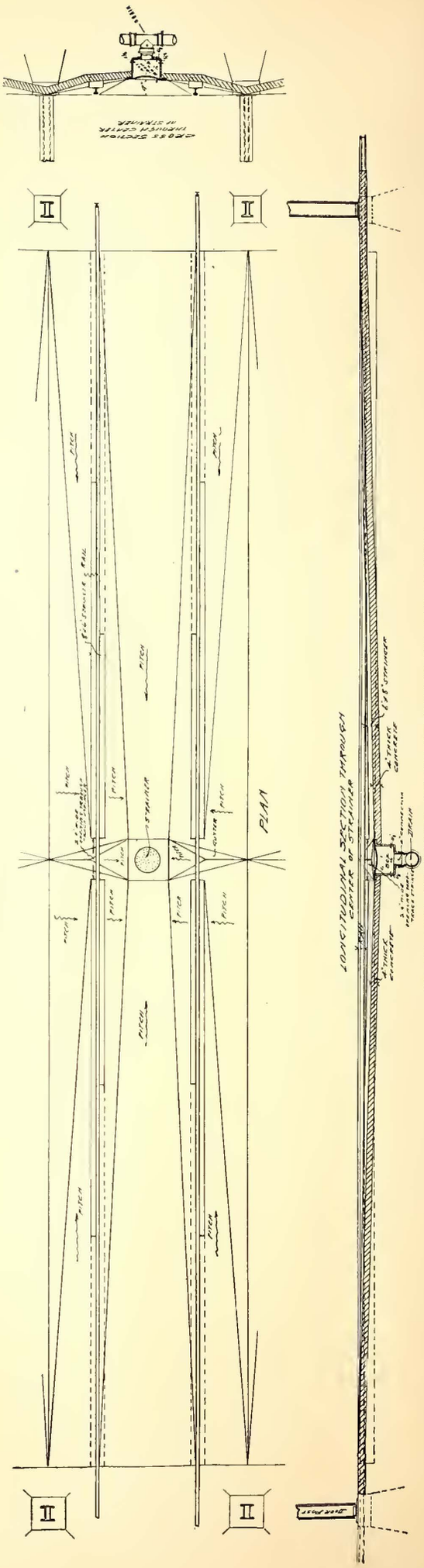
The system of repair shop records of the New York & Queens County Railway Company is very complete, and gives the manager at a glance full information as to the amount spent on repairs of cars and all of the different parts as well as the service given by the different car apparatus. From the records thus kept statistics as to the life of different parts of the car equipment are obtained, and as can readily be appreciated they are of the greatest value in determining future orders, as the record of the apparatus furnished by each manufacturer is kept separately.



The first set of records required in these compilations is a set of books kept by the master mechanic, giving the life of each important part of the apparatus subject to wear. For instance, one set of books is devoted to wheels, and a reproduction of the heading of a page of the book devoted to wheels is given on page 257. As will be seen, a line is given to each wheel. The heading given on the sixth column, which in the blank is indicated as "division," has been changed to mileage, the



LONGITUDINAL SECTION OF CAR HOUSE



PLAN AND SECTIONS OF WASH ROOM IN CAR HOUSE

Form 149-500-6-23.—1901

New York & Queens County Railway Co.

CAR DEPARTMENT.

TO GENERAL MANAGER: DAILY REPORT, ... 190

Day Men—Woodside, ...
Night Men—Woodside, ...
Day Men—34th Street, ...
Night Men—34th Street, ...
Day Men—Jamaica, ...
Night Men—Jamaica, ...
Total Men, ...

REPAIRS TO CARS.

Armatures ....
Bearings ....
Brake Shoes (New) ....
Brakes taken up ....
Brush Yokes ....
Cars Finished ....
Controllers ....
Dash Repaired ....
Field Coils ....
Fuse Boxes ....
Gates ....
General Overhauling ....
Glass Replaced ....
Hood Switches ....
Lighting Arresters ....
Light Circuits Repaired ....
Resistance ....
Steps Repaired ....
Trolley Poles ....
Trolleys Repaired ....
Wheels (New) ....

REMARKS ....

.... Supt. Motive Power.

DAILY REPORT OF REPAIRS TO CARS

figure being taken from the car mileage record book. Similar books are kept for armature, brake-shoes and trolley wheels, and a somewhat similar book for fuses. The fuse book, however, is indexed according to the names of the motormen, and its principal use is to determine whether the men are careless with their fuses. When a car starts out in the morning it is supposed to be in good condition, and this fact, as explained in the section devoted to repair shops, is certified to by the inspector. The motormen are then given six fuses, and the blowing out of an undue number of fuses shows either that the car is in bad condition or else that the motorman is careless.

Returning now to the subject of report blanks the system will perhaps be more easily understood by taking up the uses of each blank in order. Only a few of these blanks will be reproduced owing to the space available in this issue, and those will be selected which are particularly interesting. Each repair shop workman has, of course, a time card which he fills out daily and turns in to the shop foreman. This is printed with a number of lines as follows: ...... Hrs. on............ and shows the work upon which the man has been engaged. These

TABLE SHOWING LIFE AND OTHER STATISTICS OF WHEELS USED BY THE N. Y. & QUEENS COUNTY RAILWAY AND DIVIDED ACCORDING TO MANUFACTURER OF WHEELS

	Manufacturer A	Manu. facturer B	Manufecturer C	Manufacturer D	Manufacturer E	Manufacturer F
Total wheels	235	75	34	26	9	1
Less than 10,000 miles	9	....	1	....	....	....
Between 10,000 and 20,000 miles	33	6	....	6	....	1
Between 20,000 and 30,000 miles	62	24	3	16	3	....
Between 30,000 and 40,000 miles	68	30	15	3	3	....
Between 40,000 and 50,000 miles	48	14	13	1	3	....
Over 50,000 miles	15	1	2	....	....	....
Average mileage	31,748	32,302	38,108	24,578	34,032	12,621
Worn out	210	65	32	24	6	1
Broken flange	7	7	....	2	2	....
Broken spoke or hub	9	....	1	....	....	....
Other defects	9	3	1	....	1	....

time cards are classified at the repair shop and are summarized in the blank, at the top of this page, sent by the superintendent of motive power to the general manager daily, and showing the repairs made to the cars, also the number of men, day and night, employed in each of the car houses of the company.

Much the same system is followed in the maintenance of way department, where a blank, as shown below, is employed, and in the motive or power station department where the chief engineer renders a report giving the following items:

Total engine hours.
Total boiler hours.
Total output, watt-hours.
Average output, watt-hours.
Maximum output, watt-hours.
Average output per pound of coal.
Coal consumed, pounds.
Water used, cubic feet.

SHOP REPORT ON CAR WHEELS.

New York & Queens County Railway Co.

Repair Shop .... *Date* .... 189 .... *Foreman.*

DATE. IN	OUT	Shop No.	Maker's No.	Car No.	DIVISION.	CAUSE OF CHANGE.	MAKER.

SHOP REPORT ON WHEELS

FORM 157-300-5-6-1901 ORIGINAL.

New York & Queens County Railway Co.

Order No. ....
Req. No. ....
To .... *Dr.*
Consigned to .... *Address* ....

Date of Shipment, ...

NOTICE.—All Bills against the **New York & Queens County Railway Co.**, for supplies ordered, must be made out upon this Form and in accordance with the following directions:

1. Make one set of **original** and **duplicate** bills for each order, **showing order number.** Duplicate being an exact copy of the original.
2. After the supplies have been shipped, **send both original and duplicate bills, with Bill Lading, to Gen'l Manager**

I certify that the above supplies have been received in good order, and quantity and quality are correct.	Audited and found correct:	I certify that the above account is correct; that the items were contracted for on favorable terms, and were necessary for the use of the Company	Approved for Voucher. Chargeable to ....
Storekeeper	Auditor.	Purchasing Agt.	General Manager.

FORM OF BILL

NEW YORK & QUEENS COUNTY RAILWAY CO.

MAINTENANCE OF WAY DEPARTMENT.

DAILY REPORT. *For 24 hours ending* 189

REPAIR WORK.

Track ....
Paving ....
Bonding ....
Miscellaneous ....
Total Men ....

CONSTRUCTION WORK.

Track ....
Paving ....
Bonding ....
Miscellaneous ....
Total Men ....

DAILY REPORT OF MAINTENANCE OF WAY DEPARTMENT

From these reports the distribution of labor and material are made in the office of the treasurer upon three large sheets, two devoted to distribution of labor and one to distribution of

New York & Queens County Railway Co.

CAR REPORT.

LINE .....

CAR NO. ..... DATE 190

TOOK CAR OUT OF DEPOT IN GOOD CONDITION AT.....M.

TOOK CAR ON STREET IN GOOD CONDITION AT .....M.

PUT CAR IN DEPOT AT ....M.

LEFT CAR ON STREET IN GOOD CONDITION AT .....M.

FOR INSPECTION OF

TRUCK ....MOTOR NO. .....
BRAKES ....ARRESTER ....
GONGS ....LAMPS ....
GATES ....HEADLIGHT NO. .....
LIFE GUARDS .....WINDOW ....
TROLLEY ....REGISTER ....
HOOD SWITCH NO.....RESISTANCE ....
CONTROLLER NO. .....SAFETY CHAIN .....
JOURNAL BEARING NO. .....FUSE. BLOWN .....
ARMATO REBEARING NO. .....PLACE ....
MOTOR AXLE BEARING NO. ....POINT BLOWN ON .....
GEAR NO. ....CAUSE ....
GEAR CASE NO. .....MOTORMAN'S BADGE NO. .....
PINION NO. .....CONDUCTOR'S BADGE NO. .....
BRUSH HOLDER YOKE NO. .....

NOTE.—If you put car in depot in good condition, mark O. K. in large letters on the face of the card. If in bad order, mark B. O. opposite that part of the apparatus that is in bad order, and hang this card in car for the Inspector.

No.....Motorman.

No. .....Conductor.

INSPECTOR'S REPORT.

Date.....190

I have inspected, and certify that this car is in good running order.

.....*Inspector.*

"B. O." CARD FILLED OUT BY CAR CREW TO SHOW CAR PARTS IN BAD ORDER

material, labor requiring two sheets, as both hours and men paid are kept. The size of these sheets makes it impossible to reproduce them, but a good idea of the completeness with which these reports are kept can be obtained from page 255, which gives a reproduction of the headings of the blanks used in the distribution of material and distribution of labor items.

STOREKEEPING RECORDS

The storekeeper is allowed to issue material on requisition only, and the practice employed is as follows:

If the material is in stock, the repair man is obliged to fill out a requisition for the goods required, and the job for which it is needed, and this requisition is signed by the foreman and sent to the storekeeper. If the material is not kept in stock a separate form of requisition is used. The storekeeper is not the purchasing agent, but the purchases are made by the general manager upon requisition by the storekeeper, who specifies not only the apparatus desired, but the quantity desired, its destination and the price last paid. When the goods are ordered a requisition similar to that on page 257 is sent to the manufacturer, upon which the bill must be rendered in duplicate, and after the supplies have been shipped, both original and duplicate bills, with bill of lading, are sent to the general manager. As will be seen, spaces are left at the foot of the bill for o. k's. by the storekeeper, auditor, purchasing agent and general manager, before the bill is paid. If the goods are not sent directly to the storekeeper, but are delivered to one of the other departments of the company, as is often the case, the storekeeper withholds his signature to the bill until he has been notified by the foreman of the department to which the goods have been sent that the material has been received.

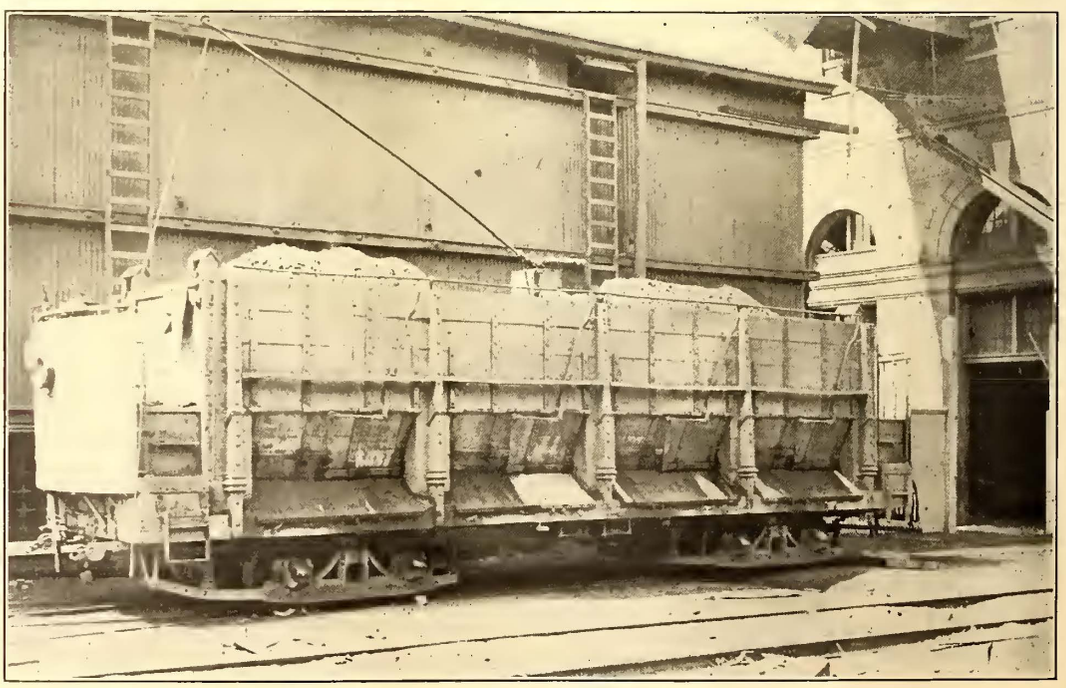
POWER STATION

All of the power for the New York & Queens County Railway Company is generated at its direct-current station at Astoria, directly opposite the foot of East Ninety-Second Street, in New York. This station, which was described in the Street Railway Journal for May, 1895, has had no increase in its equipment since that date, and is, consequently, somewhat antiquated. The equipment consists of one direct-connected 500-kw generator, one belted 500-kw generator, and two 300-kw generators.

It is an interesting fact that on busy days the 500-kw machine has frequently been called upon to deliver 1900 amps., and only fails to carry more because the commutator leads become unsoldered at that output. The company, under the new organization, will undoubtedly add largely to its power equipment and rolling stock, but the detail plans for the extensions have not been completed.

CINDER CAR AT ST. LOUIS

The St. Louis Transit Company has a number of cars of the type illustrated herewith for hauling ashes from the power house, or, if necessary, for hauling coal to the power house over steam roads. This car, when even full, holds 40 cu. yds., and can be heaped to hold 46 cu. yds. It is 40 ft. long over all, and is equipped with four Westinghouse No. 56 motors. As can be seen from the engraving, it is a side-dump car, there being four swinging doors on either side for dumping. The company

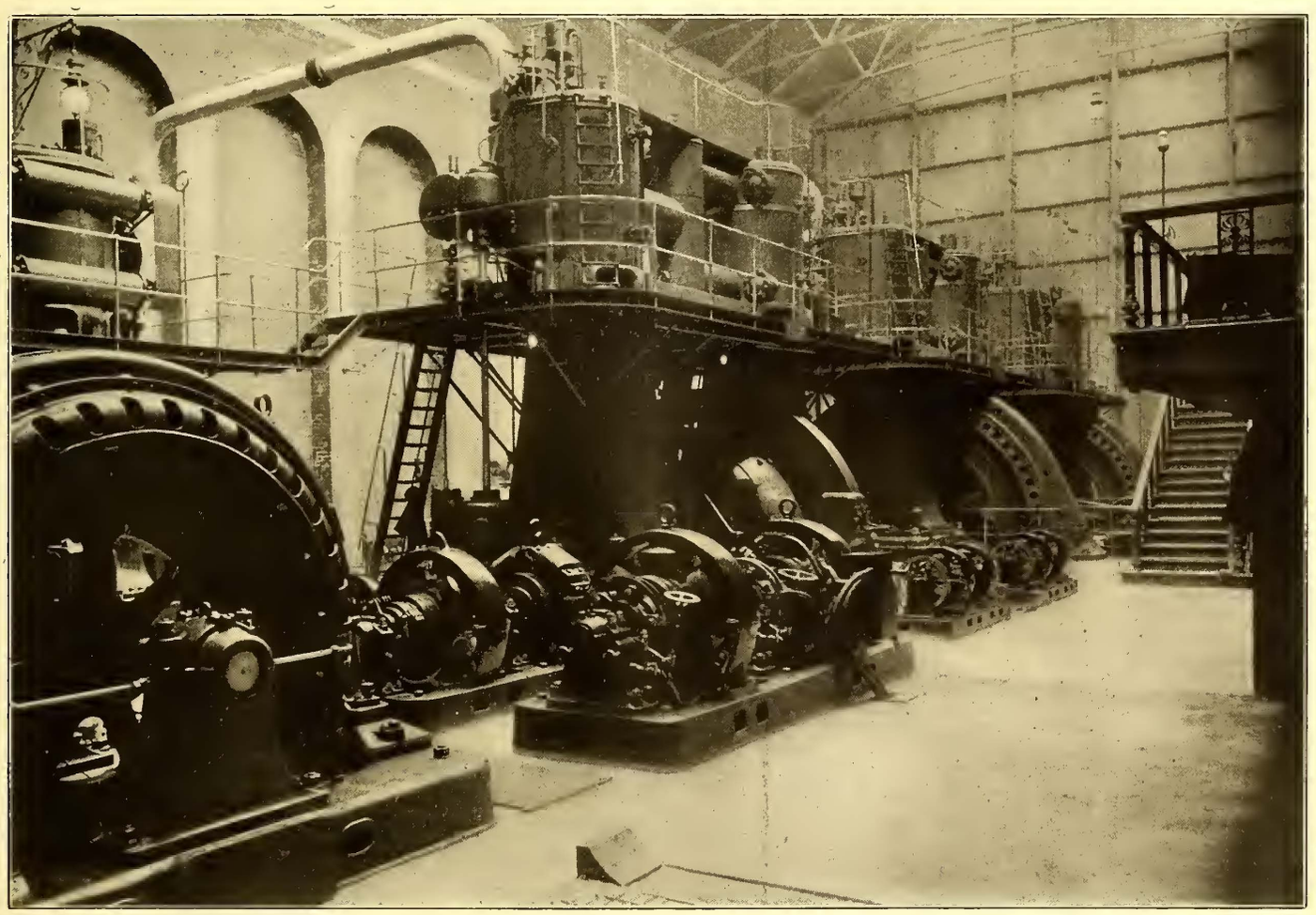


CINDER CAR OF ST. LOUIS TRANSIT COMPANY

now sells all of its ashes not required in its own construction at a price which more than pays for the handling, instead of having their handling a dead loss, as formerly. Much is used in making concrete for various purposes.

THE INTERURBAN SYSTEM OF THE SOUTH LANCASHIRE TRAMWAYS

Although city electric railway construction has progressed so rapidly in Great Britain during the past ten years that practically every large city has its tramway system, the development of interurban railroads in that country has been greatly retarded from a number of causes ever since the general introduction of electric power for transportation service in that country. The principal factors which have held back interurban electric railway construction in Great Britain have been fully set forth in the two articles which have appeared in the last two issues of this paper, written by Hon. Robert P. Porter. Mr. Porter, however, refers to one important interurban electric railway undertaking which has been put in operation during the past year in South Lancashire, and the readers of this paper have also become acquainted with some details of this project from the article by "A British Engineer" on page 8 of the STREET RAILWAY JOURNAL for July 4. It is thought, therefore, that some particulars of the equipment of this line will prove of interest.



POWER HOUSE AT ATHERTON

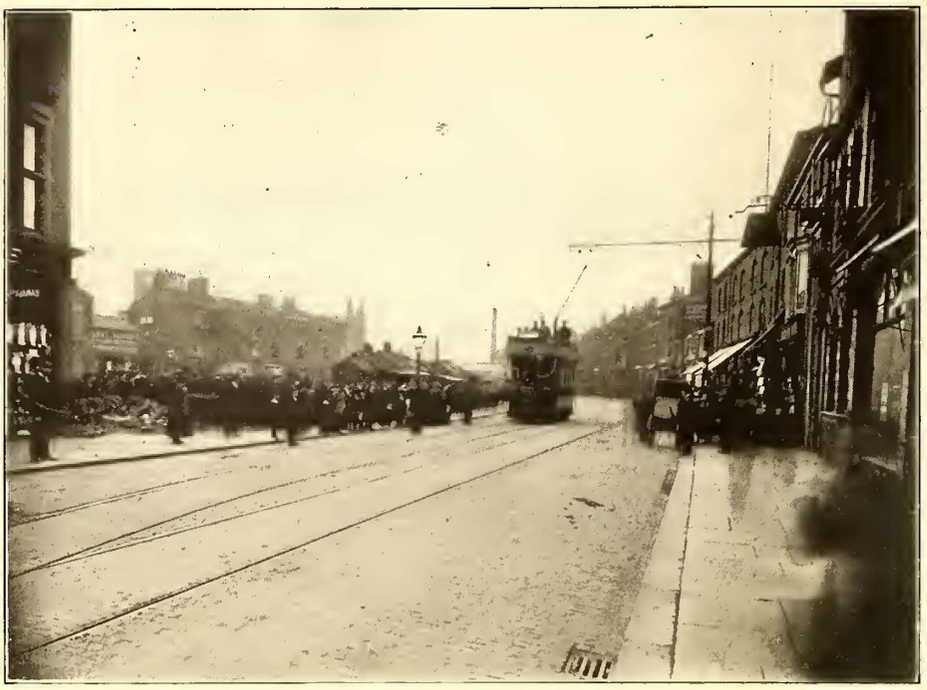
This important undertaking, which is said to be the most extensive system of tramways for which statutory powers have ever been granted by Parliament, is designed to connect the cities of Manchester and Liverpool, and at the same time serve all the important towns, villages and manufacturing and mining districts lying around and between those great commercial centers.

When the construction of the South Lancashire Tramways Company's system is completed (which in itself will traverse 113 route miles) no less than 535 miles of tramways, the greater part of which are at present isolated, will be linked up. The towns and districts thus brought into direct communication with one another will include the following: Liverpool, Manchester, Bolton, Wigan, St. Helens, Atherton, Tyldesley, Leigh, Lowton, Newton, Ealestown, Prescot, Rainhill, Knotty Ash, Warrington, Astley, Boothstown, Worsley, Eccles, Patricroft, Swinton, Salford, Walkden, Hulton, Hindley, Westhoughton, Abram, Golborne, Ashton-in-Makerfield, Haydock, Rochdale, etc. The population thus served is estimated at 5,000,000.

The first section of the South Lancashire Company's lines, 10 miles in length, was put in operation Oct. 20, 1902, and additional sections have been opened, until on March 30 of this year an inaugural trip was made between Liverpool and Bolton, which is distant from Liverpool about 26 miles and from Manchester about 10 miles.

In addition to its extent the system is especially interesting for two other reasons. In the first place, the system has been designed with a view to the institution of a freight and express service; and in the second place it exemplifies in a very marked fashion the relationship which can exist between a private company operating an interurban system and the managements of large and comparatively small municipalities which operate their own systems of tramways in their own cities. This relationship includes the right to run through cars over the municipal railway tracks, and the importance of this feature, as affecting the status of electric transportation in Great Britain, cannot be too strongly emphasized. If arrangements of this kind had not been made the South Lancashire system would have had to have a terminus at Knotty Ash, on the outskirts of Liverpool, instead of being able, as is now the case, to run cars right through the city of Liverpool down to the pier head on the banks of the River Mersey and at the very center of the city of Liverpool. These negotiations were not completed without a certain amount of trouble. That they have been completed is mainly due to Mr. Atherton, the president of the South

Lancashire Tramways Company, and to C. R. Bellamy, the popular general manager of the Liverpool Corporation Tramways, whose agreement provides not only that the South Lancashire cars will run over the Liverpool system but also that the Liverpool Corporation cars are to be allowed to continue their journey over the entire system of the South Lancashire system. This is, perhaps, not the first arrangement of the kind in Great Britain, but at the present moment, when other private companies are hammering loudly at the doors of corporations with a demand to be let into the city, it is particularly interesting and can heartily be recommended. The plan adopted is not complicated, and is similar to that usually followed in America under similar conditions. When a South Lancashire car comes to the boundary the motorman and conductor of the South Lancashire car step off and those of the Liverpool Corporation take charge, collecting their own fares. Similarly when a Liverpool Corporation car comes onto the South Lancashire system at Knotty Ash the South Lancashire Company crew takes charge and collects the fares. In that way it is only necessary to make a car mileage arrangement, which can readily be done when two reasonable business men get together. It is understood that arrangements have also been made with the city of Bolton by which the South Lancashire cars are allowed to enter that city's territory, and that later on Salford and Manchester will also probably adopt a similar plan.



ONE OF THE FIRST CARS ENTERING BOLTON

Coming now to the actual equipment of the line the system is operated from a large power station at Howe Bridge, near Atherton, in close proximity to a number of coal mines. The engine room is 60 ft. x 125 ft., and contains at present two 625-kw alternators, one 500-kw and one 350-kw direct-current generator. The alternators are two-phase and generate current at 7000 volts and 50 cycles per second at 100 r. p. m., and were supplied by Witting, Eborall & Company. They are direct-connected to vertical cross-compound engines, built by Witting, Eborall & Company. They are direct-connected by vertical cross-compound engines built by the Nuremberg Machine Works, and with cylinder dimensions, 25.5-in. and 33.5-in. x 33.5-in. stroke. The engines are designed for operating at a pressure of 155 lbs. per square inch, with a vacuum of 25 ins., and under these conditions are guaranteed to work at 23.4 lbs. per kilowatt-hour at full load. The high-pressure cylinders are arranged with four-seated lift valves, while the low-pressure cylinders are provided with Corliss valves. The governing is effected on the high-pressure cylinders only. The exciters for the alternators are rope-driven from the engine shaft, as shown on page 259.

The direct-current generators were also supplied by Witting, Eborall & Company, and the 500-kw machine is driven by an engine similar to those which supply power to the alternators, except that a separate fly-wheel of 15 tons is used. The 250-kw generator is driven by vertical cross-compound engines, with cylinder dimensions 19 ins. and 30.3 ins. x 25.6 ins. This engine has piston valves on the high-pressure cylinder and Corliss

STREET IN WIGAN WHERE SOUTH LANCASHIRE TRAMWAYS ARE COMPELLED TO AVOID THE CITY, SHOWING ALSO OLD STEAM CAR OF WIGAN CORPORATION

valves on the low-pressure cylinder, and carries a 5-ton flywheel. Its guaranteed steam consumption is 25.5 lbs. of dry steam per hour with a steam pressure of 155 lbs. and a vacuum of 25 ins.

In addition the station contains a 250-kw motor generator, operating at 300 r. p. m. The motor is a two-phase synchronous machine, which is worked directly at 7000 volts, while the direct-current generator to which it is connected can be run either as a shunt or a compound-wound machine. There is also a positive booster of 56 kw, two negative boosters of 8 kw, a milking booster of 240 amps. and a 40-kw reversible booster for the storage battery. All of these machines are driven by shunt-wound motors operating at 500 volts, and with the equipment of the sub-stations were supplied by the same manufacturers as in the case of the large generators. The switchboards in both the power station and sub-station were supplied by Ferranti & Company, and rotary synchronizers of Everett, Edgcumbe & Company's make are used throughout. The power station is served by an overhead traveling crane of 35 tons capacity, which is operated by electricity.

The boiler room contains four Lancashire boilers supplied by Yates & Thom, each being 8 ft. 6 ins. in diameter by 33 ft. long. and fitted with automatic stokers. Economizers are used and the stack, which is fitted with forced draft, is 150 ft. high.

The sub-contractors for the condensing plant were Cole, Marchent & Morley. The plant consists of two complete sets of air and circulating pumps, each set being capable of dealing with 19,000 lbs. of steam per hour. The air pumps are of the Edwards type and a Klein cooling tower is used.

At present only one sub-station is in use. It contains three 150-kw synchronous motor generators, one 20-kw positive feeder booster, one 8-kw negative feeder booster, one 14-kw battery-charging reversible booster, and one 80-amp. milking booster. The motor generators work at 7000 volts, and run at 428 r. p. m.; they are generally similar to the motor generator in the power station described above.

The cars are from the works of G. F. Milnes & Company, and are of the single-truck, double-deck type, with seating accommodations for fifty-five passengers, thirty-three outside and twenty-two inside. The motors are of the Witting, Eborall & Company's 30-hp-type, and fifty car equipments are at present in use.

The overhead line is particularly attractive and was built by R. W. Blackwell & Company, Ltd. The pole brackets are constructed with wrought-iron ornamental scroll work, and are fitted with Ætna insulation with flexible suspension. Two incandescent lamps are carried on alternate poles except in certain of the city districts, where lamps are carried on every pole.

EXTERIOR OF POWER HOUSE AND CAR DEPOT AT ATHERTON

The track is laid with 90-lb. 6-in. rail with standard gage. Tie-bars are used every 7½ ft. The track is laid on a 6-in. concrete foundation extending entirely across the track. Cross-ties are also used on a section of the track. The special work is of crucible cast-steel and was built by Askham Brothers & Wilson.

WAITING ROOM, SOUTH LANCASHIRE SYSTEM, BETWEEN LIVERPOOL AND ST. HELENS

The feeders are in general underground, and are paper-insulated and lead-covered. The high-tension feeders are carried in earthenware pipes and the low-tension feeders in wooden troughs. They were supplied by the British Insulated & Helsby Cable Company.

The engineers of the line were Messrs. Kincaid, Waller, Manville & Dawson. Sir John A. Willox is chairman of the South Lancashire Tramways and J. R. Salter is the company's chief engineer.

Before closing the description reference will be made to the freight business which the company is planning to install. As a preliminary to it, and until the service is entirely ready for operation, an express service has been instituted. The parcels are received at any point on the route by the conductors, who are furnished with a pair of scales to ascertain the weight and correct charge for the parcel given them. On receiving a package the conductor gives the shipper a numbered receipt. These receipts are printed in convenient form in triplicate. One, as stated, is handed to the shipper, a second, which is adhesive, is affixed to the parcel, and the third is returned to the company's office for checking purposes. Books of prepaid tickets are also issued to firms who have occasion to send parcels in considerable numbers. This, of course, saves considerable time in shipment.

The following rates are charged for parcels:

4 lbs	3d
14 lbs	4d
28 lbs	5d

The parcels when received are at once taken to the central office for sorting, and are then despatched by rail, carts or otherwise to their respective destinations.

The company is planning, however, to introduce a much more complete system for the transportation of merchandise, and as the system is located in one of the busiest, if not the busiest, section of country in Great Britain, or in the world, it is thought that a large business of this kind can be built up. Thousands of tons of raw cotton, manufactured goods, timber, minerals, provisions, chemicals, glass, earthenware goods, etc., are daily collected and carried at present by railroads between the cities through which the system runs, but many of the mills and factories are not now conveniently located for railroad connection, so that the cost of transshipment by wagons in many cases is excessive, to say nothing of the damage and delay. The result is that many of the manufacturing firms have found it more convenient, up to the present, to haul the goods by road, and have even instituted a system of steam motor wagons for road transportation, but this has not proved a great success.

It is proposed in the near future to connect the tramway system by means of sidings with the yards and wharves of the mills and factories, and also to establish freight depots at the most convenient places along the route where freight which has been collected may be received and despatched at convenient hours of the day, or by night, to its destination. By these arrangements very little interference will take place with the ordinary day passenger traffic. For the conveyance of general merchandise it is proposed to use two kinds of cars, viz., flat-deck cars and box cars. The former will be fitted with detachable crates on rollers. It is proposed to construct these fittings in three sections, so that one or more could be lifted off the cars, thus giving greater convenience in handling, and thus obviating the necessity of removing the whole of the upper loading capacity if not at once required. Provision for this form of traffic is somewhat different from that of coal, in which case ordinary coal cars will probably be used and run direct onto the tipping cradles at the docks. Arrangements have already been made by the company with several of the principal mill and factory owners, who have agreed to construct sidings in their works to connect with the tramways.

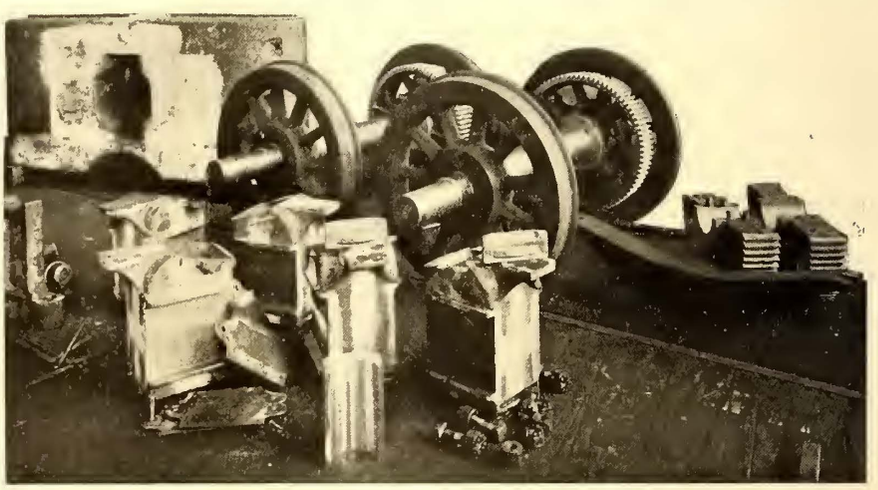
NEW ELECTRIC LOCOMOTIVES FOR THE B. & O.

A flattering recognition of the success of heavy electric traction in tunnel work is shown by the Baltimore & Ohio Railroad in increasing the equipment for the Baltimore tunnel by the purchase of two additional electric locomotives. These locomotives are now in process of construction, and will weigh 150 tons each.

They differ very radically from the first locomotives furnished this company, being much simpler in design and more accessible in construction, and equipped with the latest improvements in controlling apparatus. The whole design affords the greatest flexibility of operation.

Each locomotive is made up of two 75-ton units. The two units forming a 150-ton locomotive will be coupled together and operated with type-M control. The control is so arranged that each section may be operated independently, or any number of sections coupled together and operated from any one section.

The service required is to handle a 1600-ton train, exclusive of electric locomotive, on the Baltimore & Ohio trunk line through the tunnel over an 0.8 of 1 per cent grade at a speed of 10 miles per hour, and over a 1½ per cent grade at a speed of 9 miles per hour on 625 volts. Under practical operating conditions the motors have sufficient capacity to maintain this service hourly, running loaded up the grade and returning light. In starting they have sufficient capacity to slip the wheels, or, at not too frequent intervals, the motors are large enough to handle as heavy a train as the weight of the drivers will permit.



WHEELS, GEARS AND JOURNALS OF BALTIMORE & OHIO LOCOMOTIVE

The motor equipment of each unit consists of four General Electric 65 motors of about 225 hp each, with special slow speed winding, making a total for the eight motors of about 1800 hp.

In design the locomotive is exceedingly simple and accessible with a minimum number of wearing parts. It is believed that with this construction the maintenance account of the locomotive will be very low.

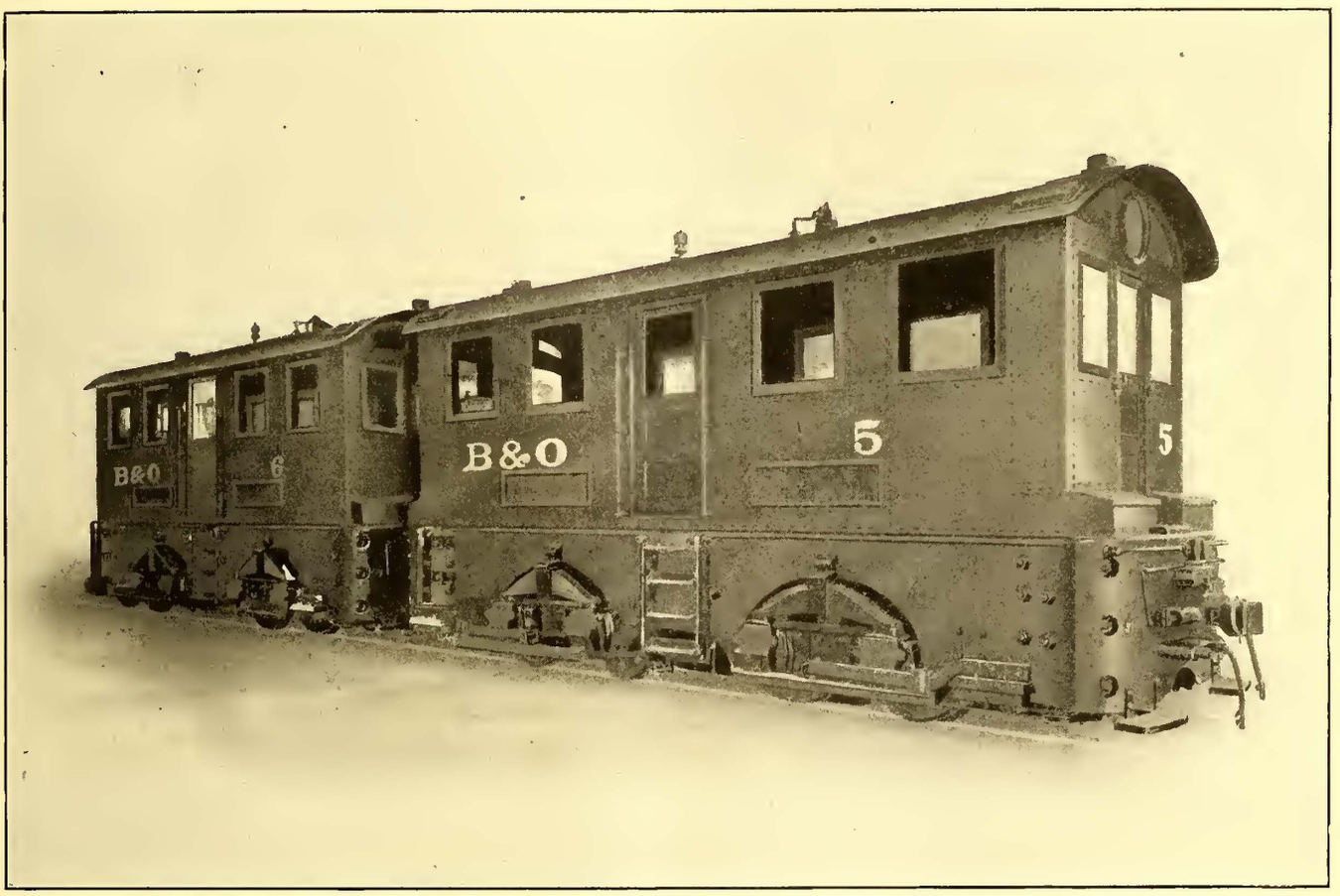
Special attention was given to securing ease of inspection for the motors, and the few number of parts entering into the truck construction. All wearing surfaces are made large for the purpose of insuring a long life. Special provision has been made for the easy replacement of wearing parts whenever it becomes necessary to renew the same. There is a large space under the cab floor in which a man can stand and inspect the motors or truck gear.

The main body of the truck consists of a rectangular frame work of cast steel built up of four pieces, two side frames and two end frames, made heavy and strong. The parts are machined at the ends and securely fitted and bolted together, thus forming a very strong and rigid structure, capable of withstanding the most severe shocks without injury. The end

pieces form the buffer beams, and to these a suitable standard draft gear of approved design is attached. The side frames have machined jaws protected by wearing shoes between which the journal boxes slide.

The truck frames are supported at four points on equalizers. Each equalizer rests on a pair of half elliptic springs, the ends of which are supported on top of the journal boxes through suitable wearing plates. This construction forms a simple and effective arrangement of parts.

The journal boxes are made quite similar to standard car journal boxes; the parts, however, are made larger and stronger. The brasses can be easily removed, and by dropping down the wearing shoes it is possible to remove a journal box



NEW ELECTRIC LOCOMOTIVES OF THE BALTIMORE & OHIO RAILROAD.

complete without removing the wheels and axles or other parts of the truck. In order that the locomotive may round curves easily, the axles are given considerable lateral movement in the journal boxes, it being practicable to do this with this design of electric locomotive, and thus reduce the effective rigid wheel base. Wheels, axles or motors can be easily removed from the trucks by dropping into a suitably constructed pit or by raising the truck frame.

Each section of the locomotive has eight steel-tired spoked wheels. The tires are 2⅞ ins. thick, with M. C. B. standard tread and flange, and are securely held in place by approved fastenings. The axles are made of forged steel, turned throughout, 6 ins. x 12 ins. in the truck journal bearings, 8 ins. in the wheel fit and motor bearings.

The cab is large and roomy. The floor rests on the truck frame. The lining floor is made of 1¾-in. hard pine, tongued and grooved; the upper floor is made of hard pine, ⅞ in. thick, tongued and grooved and laid in the opposite direction from the lining floor. Suitable traps are provided in the floor to permit of the easy passage of a man for inspection of the motors, etc.

The sides of the roof of the cab are made of sheet steel. On each side there is an entrance door, and at each end there is an additional door, which permits of ready communication between sections when coupled together. Large windows afford a practically unobstructed view in all directions.

The controlling apparatus, consisting of a Sprague-General Electric multiple-unit control system, so arranged as to be able to operate each section independently, or two or more sections coupled together. The master controller, engineer's valves, etc., are in duplicate, a complete set being located in diagonally opposite corners of each cab, so that the engineer, when it suits his convenience, can stand in the front end of the locomotive when running in either direction.

Each section of the locomotive is equipped with one bell, one whistle, two locomotive headlights, approved air-brake mechanism, including two engineer's valves and air gages, necessary brake cylinders, foundation brake, air reservoirs, couplers and draw heads, also a Leach pneumatic track sander.

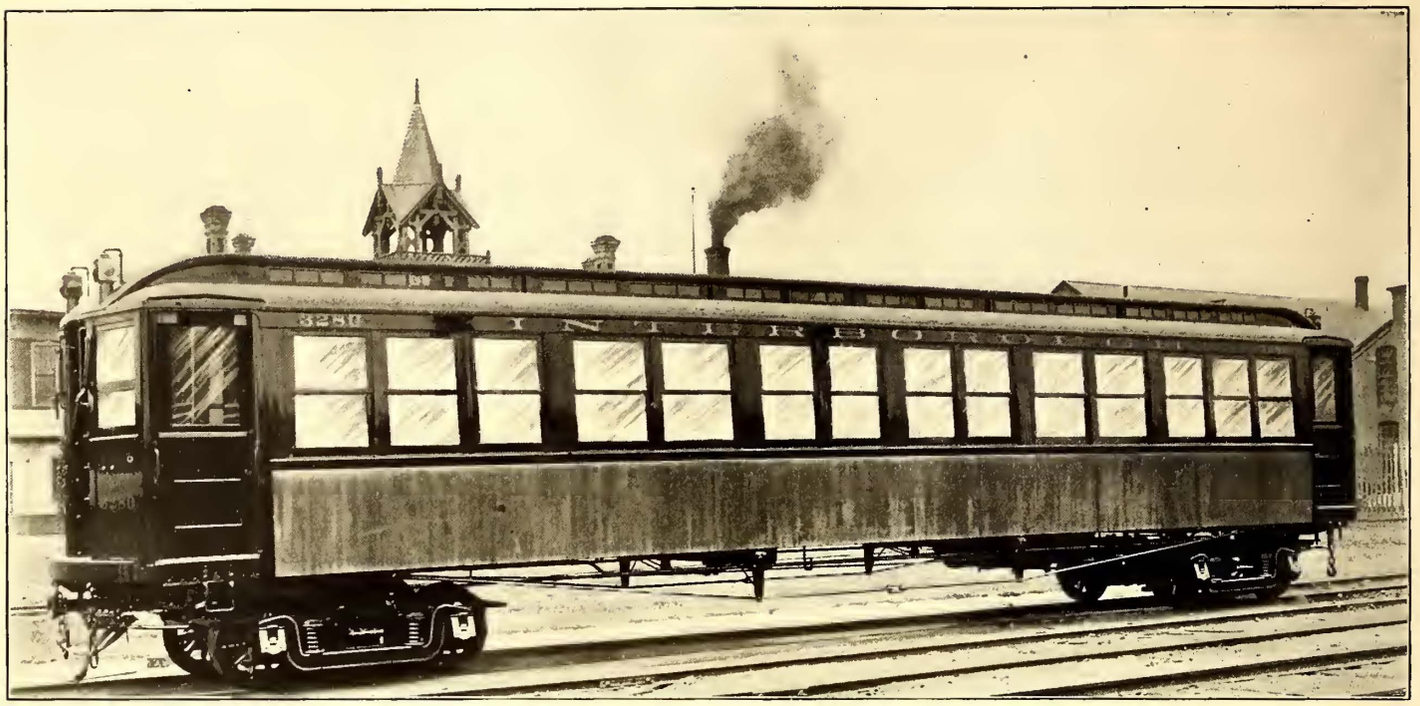
The locomotives have just been finished at the works of the General Electric Company, and will be put in service in Baltimore at once.

A well-known traffic manager of steam lines entering Indianapolis, in commenting on the encroachments that the electric railways are making on the passenger business of the steam roads, particularly the inroads made on Sundays and holidays, says that the steam roads must prepare to meet the competition. To illustrate this he said that there is not a steam line running out of Indianapolis that could not, at small expense, increase the width of its roadbed to admit of putting a third or fourth track to permit the use of electric cars on the right of way owned by the steam lines. The authority quoted thinks this would solve the question as to local traffic, but he regrets that the steam lines did not take up the question of electric competition before their territory was so thoroughly cut into by the electrics.

CARS FOR THE NEW YORK SUBWAY

The first shipment of five cars built for the new subway have just been received in New York by the Interborough Rapid Transit Company, and are now at the Ninety-Eighth Street shops. In general they resemble closely the sample cars which were described in the STREET RAILWAY JOURNAL Sept. 20, 1902, the dimensions being the same and the principal features in design, construction and equipment having been adopted. The decorations and interior fittings differ materially, however, from the sample cars, which, it will be remembered, were equipped with a variety of furnishings to enable the officers and engineers of the company to make a selection after instituting a comparison between the several styles exhibited.

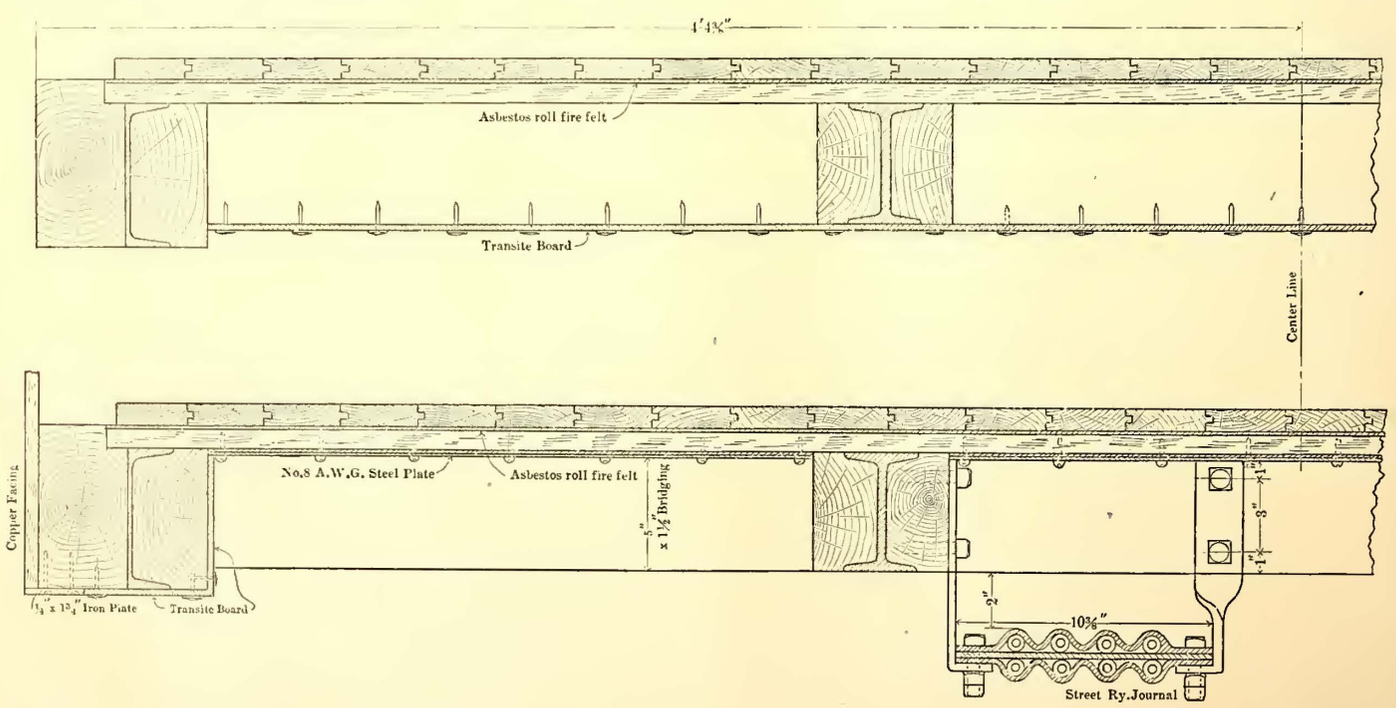
The subway cars are longer than the elevated coaches, wider at the window stools, but narrower at the deck line, owing to the tapering form adopted to conform to the tunnel, and the roof is considerably lower for the same reasons. The dimensions of the subway cars and those of the elevated are given herewith, and a comparison will show that they differ materially in many respects:



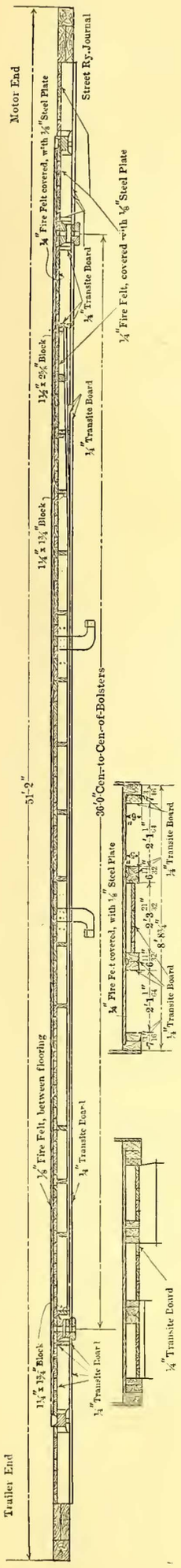
ONE OF THE FIRST SUBWAY CARS

	Subway.		Elevated.	
	Ft.	In.	Ft.	In.
Length over platforms	50	1	47	1
Length over car body	42	7	39	10
Length center of bolsters	36	0	33	2
Width over window stools	8	11⅝	8	9
Width over sheathing	8	9¾	8	7
Width over deck eaves' moulding	8	5	8	9½
Height, top of rail to center draw-bar	2	5	2	5
Height, top of rail to under sills	3	1⅛	3	3¼
Height, top of rail over platform	3	8	3	9
Height, top of rail over roof	12	0	12	10½

The exterior of the subway car differs in appearance very markedly from that of the elevated, as the former is vestibuled at both ends and has a copper-faced sheathing below the belt



BOTTOM LINING AND SUSPENSION OF MOTOR LEADS



FIREPROOF CONSTRUCTION OF BOTTOM OF CAR

rail. The woodwork on the car body and the vestibules is painted a tuscan red, the Pennsylvania Railroad standard having been adopted. In the interior the difference is equally noticeable, as the car has been given a very light finish, and the space between the longitudinal seats is greater than in the present elevated coaches. Exterior and interior views of one of the new cars accompany this article, from which an excellent idea of their general appearance may be gained.

In construction the general features are the same as those of the sample cars, the only changes made having been adopted with the view of adding to the strength of the structure by substituting slightly heavier timbers than those originally suggested. The framework is particularly heavy. The longitudinal sills are of compound construction, with center cross-trussing between the steel needle-beams, and the platform end sills are of steel, fitted with heavy steel anti-telescoping plates. The side framing of the car bodies is of white ash, doubly braced and very heavily trussed. The platform posts are of compound construction, with anti-telescoping posts of steel bar sandwiched between heavy white ash posts at corners and centers of the vestibule platform. These posts are securely bolted to steel longitudinal sills, the steel anti-telescoping plate below the floor and to the hood bow, which serves to reinforce it, and is of heavy steel angle in one piece, reaching from plate to plate and extending back into the car body 6 ft. on each side.

By this construction, it is believed, the structure is made practically indestructible. In case of accident, where one platform rides over the other, 8 sq. ins. of metal would have to be sheared off in the posts before the main body of the cars would be reached. This would afford effective means of protection.

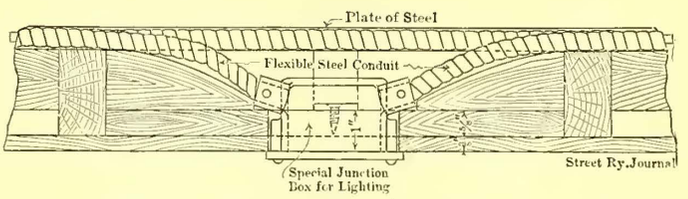
The floors are double with asbestos roll felt sandwiched between, and the floor sheathing is of white pine completely covered on the under side with ¼-in. asbestos transite board. All parts of the car framing, flooring and sheathing are covered with fireproofing compound.

These precautions to secure safety from fire extend to the arrangement and installation of the electrical apparatus and the electrical wiring. For the lighting circuits a flexible steel conduit is used, and a special junction box has been designed. This feature is illustrated herewith. On the side and upper roofs, over these conduits for the lighting circuits, a strip of sheet iron is securely nailed to the roof boards before the canvas is applied; the entire under portion of the car flooring is covered with electrobestos, and the wires are carried in ducts moulded into suitable forms

INTERIOR NEW INTERBOROUGH CAR

made from the same material. The pump box under the car is lined with steel. Special precautions have been taken with the insulation of the wires, the specifications calling for, first, a layer of paper, next, a layer of rubber, then a layer of cotton saturated with a weatherproof compound, and outside of this a layer of asbestos. The hangers supporting the rheostats under the car body are insulated with wooden blocks, which are subjected to a special process, being dried out in an oven and then soaked in an insulating compound, and covered with ¼-in. transite board. The rheostat boxes themselves are also insulated from the angle-iron supporting them. Where the wires pass through the flooring they are hermetically sealed to prevent the admission of dust and dirt.

An idea of the construction of the flooring can be gained



SPECIAL JUNCTION BOX FOR LIGHTING CIRCUITS

from the accompanying diagrams, showing the bottom lining and suspension of motor leads and the fire-proofing of the bottom of the cars. The floor ceiling is of ¼-in. transite board, securely nailed to all bridges and carefully fitted to the side sills, and all joints are cemented with asbestos cement. In all spaces above the motor truck in the floor framing, between sills and bridging, are plates of No. 8 steel and ¼-in. roll fire felt, securely fastened with screws and cleats. These extend from the platform end sill to the third line of bridging back of the bolster in sections for fire protection. The construction adopted provides that in case of the entire weight of the car being suddenly dropped upon the trucks, the motors and leads would not be injured.

At the forward end, or what is known as the No. 1 end of the car, all the wires are carried to a slate switchboard in the motorman's cab. This board is 44 ins. x 27 ins., and is mounted directly back of the motorman. The window space occupied by this board is ceiled up with mahogany panels, the space back of the panels is boxed in and provided with a door

of steel plate, forming a box, the cover, top, bottom and sides of which are lined with electrobestos ½ in. thick. All of the switches and fuses, except the main trolley fuse and bus-line fuse, which are encased and placed under the car, are carried on this switchboard. Where the wires are carried through the floor or any partition a steel chute, lined with electrobestos, is used to protect the wires against mechanical injury. This also makes the wiring fireproof.

An innovation in the general design of these cars is the arrangement of the platform. The cars are vestibuled, and when made up into trains each car can be closed so as to be entirely distinct or a passageway may be opened throughout the train. The platforms are of the Gibbs patent type, with side doors arranged to slide into pockets in the side framing, thereby giving up the entire platform to the passengers. The sliding door in the motorman's cab may be partly opened and secured in this position by a bar, which will serve as an arm-rest for the motorman. The platform swinging door is arranged to close the passageway in one position, and to inclose the master control and brake valve in the other position. The side plates of the car extend to the front of the vestibule. Each vestibule is fitted with two windows, and each window is fitted with upper and lower sashes of straight grained mahogany; the upper sash being arranged to drop and provided with rubber stops.

Pitt safety gates for coupling between cars are provided. They are fastened to the vestibule corner posts by means of malleable castings. These gates are placed on left-hand corner of the vestibule, looking at the end of the car from the outside. They are constructed so as to adjust themselves to suit the various positions of two adjoining cars while passing in, around and out of curves of 90-ft. radius. A substantial malleable iron bracket is fastened to the face of the vestibule sheathing, to which the gates are to be attached when not in use.

On the door leading from the vestibule to the body of the car is a curtain that can be automatically raised or lowered as the door is opened or closed to shut the light away from the motorman. Another attachment is the peculiar handle on the sliding door. This door is made to latch so that it cannot slide open with the swaying of the car, but the handle is so constructed that when pressure is applied upon it to open the door the same movement will unlatch it.

Entering the car the visitor is at once impressed by the amount of room available for passengers. The seating arrangements are similar to the elevated cars, but as the subway coaches are longer there are two additional seats on each end. The total seating capacity of each car is fifty-two. The seats are all finished in rattan, and are designed for rapid loading and unloading, and their outlines are rounded to the slightest curves. Stationary cross-wise seats, after the Manhattan pattern, have been adopted. The longitudinal seats are 17¾ ins. deep, with the exception of those nearest the door, which are only 15½ ins., as the pocket for the sliding doors cuts off a portion of this space. The space between the longitudinal seats is 4 ft. 5 ins., giving a much greater clearance than the Manhattan type.

The windows have two sashes, the lower one being stationary, while the upper is a drop sash. This arrangement reverses the ordinary practice, and is due to the desire of the management to keep the passengers from thrusting their arms and heads out of the windows and thus incurring danger of striking some obstruction. The side windows in the body of the car, also end windows and end doors, are provided with "Pantasote" curtains with pinch-handle fixtures.

The floors are covered with hard maple and securely fastened with oval-head brass screws.

Six single incandescent lamps are placed on the upper deck ceiling and a row of ten on each side deck ceiling is provided. There are two lamps placed in a white porcelain dome over each platform, and the pressure gage is also provided with a miniature lamp. Head linings are of composite board. The interior finish is of mahogany of light color.

A straight grained polished mahogany hand rail, 1½ ins. in diameter, extends the full length of the clere story on each side of the car, supported in brass sockets at the ends and by thirteen heavy brass brackets on each side. These brackets have smooth round holes for the bell cord. The hand rail on each side of the car carries thirty-eight plain leather straps, forming loops 14 ins. long, 1¼ ins. wide and ⅛ in. thick, lapped together at the ends and secured by two copper rivets. Hand straps are to be distributed on hand rails, two opposite each of the four middle side windows and three opposite each of the other side windows.

Each sash is secured on the inside to a brass operating arm, manipulated by means of iron rods running along each side of clere story, and each rod is operated by means of a brass lever, having a brass fulcrum secured to the inside of the clere story.

All hardware is of bronze, including all locks, pulls, handles, sash fittings, window guards, railing brackets and sockets, bell cord thimbles, chafing strips, hinges and all other trimmings.

The upright panels between the windows and in the corner of the car are of plain mahogany, as are also the single-post pilasters, all of which are decorated with marqueterie inlaid. The end finish is of mahogany, forming a casing for the end door.

The general features of the motors and trail cars are the same, and they will all be wired so that they can be used as motor cars on demand. The entire car equipment for the subway will be uniform, and they will all be built after the specifications of the Interborough Company, the type here illustrated and described having been adopted as the standard for the road. The initial equipment will comprise 500 cars, orders aggregating that number having been placed with the John Stephenson, St. Louis, Jewett and Wason companies. These cars were designed by George Gibbs, consulting engineer, and by W. T. Thompson, master mechanic of the Interborough Rapid Transit Company.

THE INDIANAPOLIS & CINCINNATI TRACTION COMPANY

An interurban railway undertaking which is of somewhat different character from the usual interurban electric road as constructed so extensively in the Central States, is that of the Indianapolis & Cincinnati Traction Company. Construction is now in progress between Indianapolis and Rushville. Charles L. Henry, who will be remembered as the promoter and organizer of the Union Traction Company, of Indiana, and formerly its president, is president and general manager of the new undertaking. According to Mr. Henry's plans, the road will cater mainly to the through traffic between Cincinnati and Indianapolis, rather than to the local traffic that is the chief source of income on the majority of interurban roads at the present time. It will thus come into direct competition with the two steam roads between those points for the patronage of passengers to whom time is an object. The line is to be graded for double track. In locating the road care has been taken to maintain an alignment that will permit of high speed, even at the expense of grades, as it was reasoned that grades could be overcome by power or by momentum and would not prohibit high speeds, while on the other hand there is no possible way of making a crooked line safe for high speeds. The overhead trolley will be used, as it is considered more desirable than the third rail, everything considered. Between the Indianapolis city limits and Rushville there is no curve which will not permit cars to speed up to 70 miles an hour. From Rushville the road is surveyed to Connorsville, and from there it will run to Oxford, Ohio, and Hamilton.

COMPLETION OF THE ELECTRIC RAILWAY BETWEEN COLUMBUS, OHIO, AND INDIANAPOLIS, IND

The completion of the Indianapolis & Eastern Railway, from Indianapolis to Dublin, and of the Dayton & Western Railway, from Dayton to Richmond, completing the gaps in a chain of electric railways extending through Indiana and Ohio, and connecting Columbus and Indianapolis, was formally celebrated at Richmond, Ind., on Wednesday evening, Aug. 12. The city was elaborately decorated in the national colors, and thousands of citizens from the two States gathered to join in rejoicing with the officials of the roads, the State, county and municipal officers and other invited guests. It was a matter of regret that neither Governor Durbin, of Indiana, nor Governor Nash, of Ohio, could be present.

INTERURBAN LINE BETWEEN INDIANAPOLIS, IND., AND COLUMBUS, OHIO, WITH CONNECTING LINES

The cars from Indianapolis from the west, and those from Dayton from the east, and the cars of Richmond Street & Interurban Railway Company from Milton arrived in front of the Westcott Hotel about the same time. The visitors, numbering in all over two hundred, took dinner at the Westcott, having been met by reception committees. At 7:30 the procession to Glen Miller Park began. The Richmond band, in an open car, led the way, followed by the interurban cars. The trip to the park was one of continuous ovation. Red light illuminated the scene all the way.

The exercises at the park were of an informal nature. Hon. Wilfred Jessup acted as chairman, and introduced the speakers in a felicitous manner. Mayor Zimmerman was first introduced. He made a brief but fervent address of welcome. W. A. Hough, of Greenfield, attorney for the Indianapolis & Eastern, spoke in behalf of that line. He reviewed the history of the pioneer line, and paid a deserved tribute to the energy and progressive spirit of the men connected with the road from its inception to the present time. J. S. McMahan spoke in behalf of the Dayton & Western Company. He boasted jokingly of Dayton as an interurban center, and said that Dayton had annexed Columbus, Cincinnati, Eaton, and other Ohio cities, and was now about to invade Indiana and annex Richmond.

Mayor Bookwalter, of Indianapolis; Judge Gilmore, of Eaton, and Senator Sheppard, of West Alexandria, spoke in behalf of their cities, each making appropriate remarks. Judge Gilmore said that the interurban lines had not only enlarged the social realm, but they had enhanced the value of property from 20 per cent to 50 per cent. Mayor Bookwalter compared the joining of the two States by electric railway to a marriage ceremony, with Indiana and Ohio as the contracting parties. An elaborate display of fireworks on the banks of the lake terminated the celebration.

FROM INDIANAPOLIS TO COLUMBUS

The special car from Indianapolis left at 2:30 p. m. and arrived at Richmond at 6:00. No attempt was made for a record of fast time, stops being made at a number of points to take those invited to accompany the party. The trip was made in one of the new cars built by the Kuhlman Company, which is a palace of comfort and convenience. The Indianapolis party was made up of Frank M. Fauvre, president; J. W. Chipman, secretary and general manager; D. H. Robinson, superintendent; Mayor Bookwalter, Harold McGrew, Charles McGuire, Conrad Keller, members of the board of public works; E. D. Logsdon, member of the board of public safety;

John McGregor, John McGaughey and Thomas Spafford, county commissioners; Harry B. Smith, county auditor; W. A. Rhodes, vice-president of the City Council; R. O. Johnson, Fred Sheppard, E. F. Warfel, H. D. Michael, R. D. Fisher and others.

At Greenfield the Hancock County delegation was taken on board. The delegation was made up of Col. E. P. Thayer, County Auditor E. C. Richmond, Judge Felt, J. Ward Walker, Commissioners Barnard and Webb, Councilmen Wood Walker, F. G. Banker and Will A. Hough, attorney for the road. The Knightstown party was composed of Councilmen J. D. Snow, James Hudson, T. G. Cammack and W. C. Gurley; E. N. Sherbern, city engineer, and Frank Dovey.

A small party was taken on at Lewisville, including Albert Porter and L. F. Symons, cashier of the First National Bank, and G. W. Russell, commissioner of Henry County.

At Dublin, Albert Davis, Edward Myers and other prominent citizens joined the party. The official photographers of the road joined the party at this point, but before starting the car was run on the Y and the car and whole party were photographed. Small parties were taken on at Cambridge City and Centerville. The car was delayed at one point twenty minutes, as it was necessary to remove the trolley stand in order to pass under a low bridge.

When the Indiana car left Indianapolis it was the purpose of General Manager Chipman that his car and a few invited guests should go on an extensive trip through Ohio, touching Dayton, Springfield, Columbus, Newark and Cincinnati. The car left Richmond at 8:30 on Thursday morning, over the Dayton & Western line, and at nine minutes to 9 o'clock the first Indiana car passed into Ohio, marking, as it is believed, the beginning of a great interstate trolley traffic.

The party was made up of President Fauvre, General Manager Chipman, George L. McNutt, Ward S. Arnold, manager railway department of the Bullock Electric Company, of Cincinnati; Charles B. White, agent for the Harrison Safety Boiler Works, of Philadelphia; G. C. Kuhlman, of the Kuhlman Car Company, of Cleveland; R. D. Fisher, representing the Street Railway Journal, and Monroe George, official photographer. The car arrived in Dayton at 10:45, making the 40-mile run in less than three hours, despite the fact that a portion of the route was over new and unballasted track.

The Indiana car was at last denied further progress. Because of its great length and width, and the peculiar curve in the tracks at the entrance to the Fifth Street bridge, and, to the great disappointment of Manager Chipman, the trip to Columbus and Newark was necessarily abandoned. President Winters, of the Dayton & Western Company, did everything possible to overcome the obstacle, but the iron bridge could not be made wider, nor the approaches changed in a day. The incident, however, has aroused the city of Dayton to the necessity of constructing a number of modern bridges over the Miami River. The return trip from Dayton to Indianapolis was made Thursday evening, without incident. The trip was very enjoyable, and all concerned agree that much of the pleasure of the trip was due to Manager Chipman's care and kindness.

THE ROUTE AND THE CONNECTIONS

The accompanying map shows the chain of interurban lines now connecting the two cities. As has previously been stated, the last link to be built was that between Eaton, Ohio, and Richmond, Ind., belonging to the Dayton & Western Railway Company, which had previously built the line between Dayton and Eaton. Beginning at Indianapolis and going eastward the first road in the chain is the Indianapolis & Eastern Railway, which carries passengers as far as Dublin, Ind., where connection is made with the Richmond Street & Interurban Railway Company's line, operating between Dublin and Richmond. Between Richmond and Dayton is the Dayton & Western Railway; between Dayton and Springfield, the Dayton, Springfield & Urbana Electric Railway, and between Springfield and Columbus, the Columbus, London & Springfield Railway. The two latter roads are controlled by the Appleyard syndicate. The distance between the two State capitols is 188 miles. From Columbus it is possible to go 38 miles east to Newark, Ohio, on the Columbus, Buckeye Lake & Newark Traction Company's lines. A line is soon to be completed from Newark to Zanesville, which will complete the chain from Indianapolis to Wheeling, W. Va. The map is not intended to be complete, and does not show electric lines in either State other than those actually in operation or nearing completion, which form part of the networks centering in Indianapolis, Columbus and Dayton. There are many lines radiating from Cincinnati not shown, and the northern part of the State between Toledo and Cleveland has even more extensive interurban service than the southern part of the State.

ANALYSIS OF THE OPERATING REPORT OF THE INTERNATIONAL TRACTION COMPANY

BY H. D. EMERSON

The International Traction Company, through its ownership of the stock of the International Railway Company, owns and controls practically all of the street railroads in Buffalo, and a large number of the outlying interurban roads. According to the latest authentic reports the system includes 352 miles of track.

The income account for the fiscal year ended June 30, 1903, compared with the two years preceding, is as follows:

	1903	1902	1901
Gross earnings	$3,728,173	$4,566,502	$3,092,016
Operating expenses	2,013,624	2,254,084	1,587,407
Net earnings	$1,714,549	$2,312,418	$1,504,609
Charges	1,538,484	1,548,960	1,030,436
Surplus	$176,065	$763.458	$474,164

The decrease in earnings for 1903 from 1902 is explained by the large but temporary Pan-American traffic, and, consequently it is much fairer to compare the earnings for the year just past with the earnings for 1901. This comparison, with the changes, is as follows:

	1903	1901	Changes
Gross earnings	$3,728,173	$3,092,016	Inc. $636,157
Operating expenses	2,013,624	1,587,407	Inc. 426,217
Net earnings	$1,714,549	$1,504,609	Inc. $209,940
Charges	1,538,484	1,030,436	Inc. 508,048
Surplus	$176,065	$474,164	Dec. $298,099

The increase in gross earnings of 21 per cent is normal and to be expected in a city developing as rapidly as Buffalo, but part of the increased earnings is undoubtedly due to the increased mileage. We have not the statistics at hand showing the comparative mileage for the year just ended and 1901, but material additions have been made to the lines operated, although not sufficient to account for more than part of the increased gross. The operating expenses, that is the percentage of operating expenses to gross earnings, has materially increased, and the probabilities are that the present ratio of 54.01 per cent is more nearly the ratio which future operations will develop than the preceding ratio of 51.26 per cent. The International Traction Company, having long time franchises, has no particular object in reducing temporarily its cost of operations. On the other hand it has the same inducement as have steam railroads to fully maintain its property, and to charge the cost of such complete maintenance into annual expense rather than as against

capital account. The charges have materially increased, as the result of additions to the plant, both for the Pan-American traffic and for extensions and branches, but from now on we should begin to see a reduction in this account. An examination of the prior lien bonds outstanding develops the fact that $950,000 drawing interest at 7 per cent and 10 per cent, maturing on or before 1904, and that $150,000 at 5 per cent, also maturing in the same year. These bonds can be refunded and replaced with the collateral trust 4 per cents, which will reduce the fixed charges. In the same way a majority of the remaining outstanding prior liens mature in the next decade, and the substitution of the 4 per cents will again diminish fixed charges.

The net earnings for the present year are under the required $200,000 for the cumulative dividends of the $5,000,000 outstanding preferred stock, but it would seem that the operating expenses and the fixed charges other than interest, might be reduced, and consequently a surplus shown for the common stock. The full annual report of the corporation is waited with much interest, as it will give the various items which go to make up the fixed charges and the operating expenses, and we can then determine what proportions are permanent and what were temporary increases for the year just ended.

The International Traction Company, viewed strictly from a financial standpoint, is one of the best traction companies which have sprung into existence in the past few years. It has practically perpetual franchises, running, as they do, for over 900 years, which is very materially greater in length of time and beyond the maturity of any of its outstanding obligations. In this respect its financial doings can be considered in the same manner, and the same rules applied, as are applicable to steam railroads.

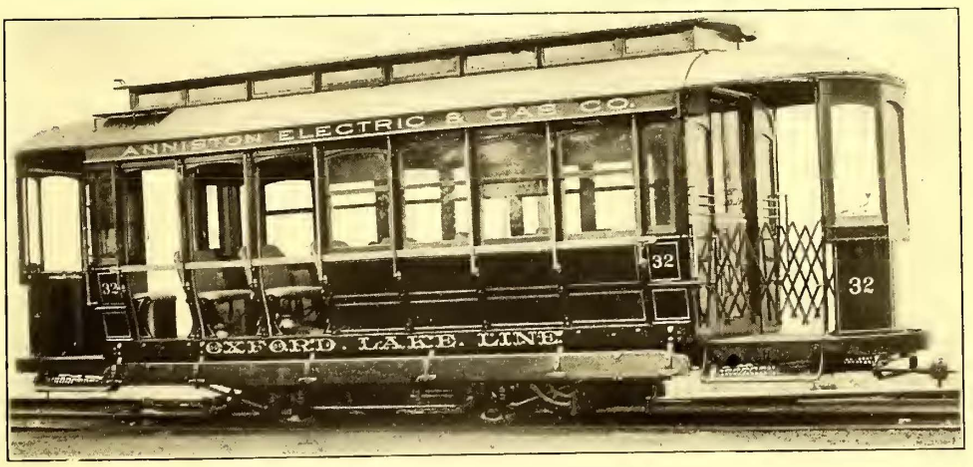
In considering the earnings of steam railroads a decrease in net earnings is not considered as detrimental to the property or to the value of securities as a decrease in gross earnings, because a decrease in net may indicate simply changes strictly under the control of the management. In the past few years we have found when considering steam railroads that decrease in net earnings oftentimes meant the best management, because when figures were finally analyzed and the doings of the property summarized, it became evident that the management was spending more money in maintenance than was absolutely necessary to keep the property in safe working condition. This added expenditure for maintenance, or, as it is frequently called, over-maintenance, is in effect a reserve fund invested in the property, for if the expenditures are carefully and intelligently made the property is put in such condition that expenses can safely be reduced when gross earnings fall off. In considering the maintenance accounts of most electric railway and traction companies, it has been demonstrated in many cases that the figures submitted cover simply daily operations and the expenditures necessary simply to keep the traffic moving.

In the case of a new trolley road the absolute necessary cash expenditures are much less for the first few years than for the second five. New rails, new equipment and new motors should not, and naturally do not, require the same expenditures for upkeep that will be laid out after the plant has become worn. Of course a decrease in net earnings, resulting from an increase in operating expenses, is temporarily disadvantageous to stockholders, but the experience of steam railroads has been that it is much better to defer dividends on stock and have an ample reserve by putting the property in first-class condition, than it is to pay dividends to the limit. The report of the International Traction Company, on the face of it, tends to demonstrate that its management at least is making all proper expenditures, and is charging the same to the operating expense. This policy is to be commended, and its adoption by other traction companies will tend materially to strengthen the public confidence in traction securities.

CONVERTIBLE CARS FOR ANNISTON, ALABAMA

The J. G. Brill Company recently completed three cars of its patented convertible type for the Anniston Electric & Gas Company, of Anniston, Ala., the order for which was placed by the General Electric Company, of Schenectady, N. Y. Anniston is a town of 14,000 population, situated in the northeastern part of Alabama, at the junction of several trunk railroads, and is the commercial center of a large district. Large steam car building shops are located there, and the town furnishes an excellent field for electric railway operation. Oxford Lake Park, about 4 miles south of Anniston, is a pleasure resort owned by the railroad company, containing about 70 acres, and is very popular. There are bathing houses at the lake, a half-mile race track and a large dancing pavilion. Each year a fair is held at the park. Cars of the type herein described are intended for use on the line running to the park.

The accompanying cut shows the car partly opened, the running board is folded up and the guard rail down. The vestibules at either end are the builders' removable type, and are well suited to this style of car, especially in the South, where in winter it is only necessary to furnish protection from rain. The cars are 20 ft. 7 ins. long over the end panels; 29 ft. 7 ins. over crown pieces; from end panels over crown pieces, 4 ft. 6 ins.; width over sills and sill plates, 6 ft. 11¼ ins.; width over posts at plate, 7 ft. 9 ins. From center to center of posts, 2 ft. 7 ins.; sweep of post, 5 ins.; thickness of corner posts, 3¾ ins.; thickness of side posts, 3⅜ ins. The interiors are finished in natural cherry with ceilings of decorated birch. The seats are of the Brill patented revolving type, 34 ins. in length, with spring cane seat and back, and furnish seating for twenty-eight passengers. The cars are mounted on No. 21-E trucks, having a 7-ft. wheel base, 33-in. wheels, and 4-in. axles. The trucks are equipped with General Electric No. 67-motors; weight of a car and truck without motors about 18,000 lbs.



CONVERTIBLE CAR FOR ANNISTON, ALA.

The new touring car on the Cleveland Electric Railway has proved such a popular innovation that a second car will be added. The routes of the present car have been rearranged so that it now makes an extra trip.

ECONOMY JOURNAL LUBRICATOR

A journal lubricator, which is said to be meeting with quick success among electric railways, as well as steam roads, in the vicinity of Chicago, is now on the market under the name of the Economy journal lubricator, and is made by the Railway

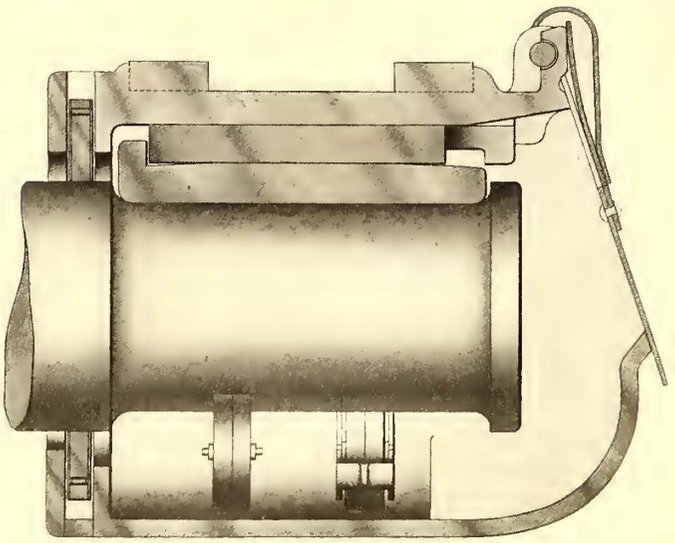


FIG. 1.—M. C. B. 5-IN. X 9-IN. JOURNAL, SECTIONAL SIDE VIEW

Journal-Lubricating Company, of Milwaukee, and of Chicago.

This journal lubricator depends for its operation on the distribution of oil on the journal by two small ball-bearing lubricating wheels, the lower portions of which run in the oil. Fig. 1 is a sectional side view of an M. C. B. 5-in. x 9-in. journal box equipped with the new lubricator. Fig. 2 is a sectional end view of the same box, and Fig. 3 is a sectional view from the

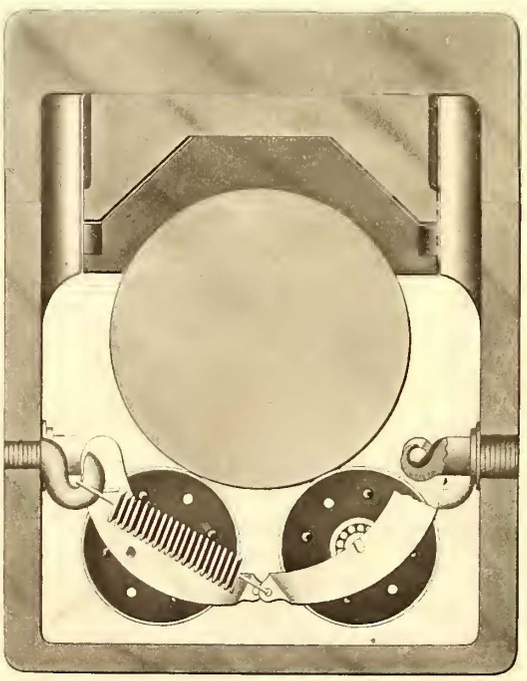


FIG. 2.—SECTIONAL END VIEW

top, looking down on the lubricators in position in the journal box. From Fig. 1 and Fig. 2 it is seen that these little ball-bearing lubricating wheels run in oil in the lower part of the journal box. The oil is carried by capillary attraction on the rims of the lubricating wheels to the car journal. The wheels are held against the journal by a spring pressure. The whole apparatus is easily taken apart without the removal of any bolts or screws.

In connection with this lubricator it was necessary to devise a dust guard which would effectually close the space around the journal where it passes out of the box. The dust guard is shown in Fig. 4, and has two hard-fibre guards held by springs against the journal, the springs being arranged to provide for both vertical and horizontal movement. The bottom of the journal box is filled with oil, which is practically all returned after being used on the bearing. The dust guard and shape of the box near the dust guard are such that

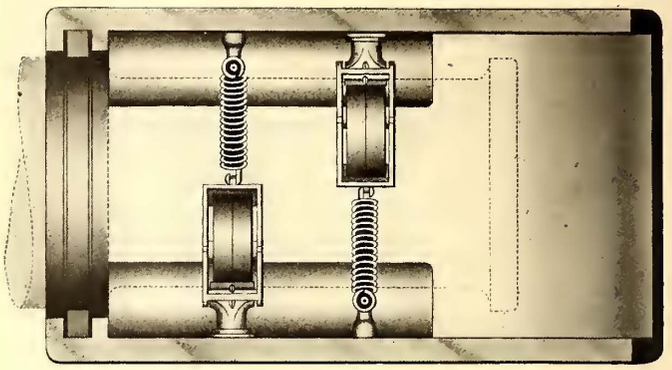


FIG. 3.—LOOKING DOWN ON LUBRICATORS IN POSITION IN JOURNAL BOX

whatever oil creeps toward the dust guard is returned to the bottom of the box instead of running down the outside.

The most notable use of this lubricator is on the Aurora, Elgin & Chicago Railway, which is a very high-speed line, cars weighing 74,000 lbs. making over 60 miles per hour. The importance of first-class journal lubrication was early apparent in the operation of this road, and all the cars are now being equipped with this lubricator. It is also in use on the Halsted Street and Wentworth Avenue lines of the Chicago City Rail-

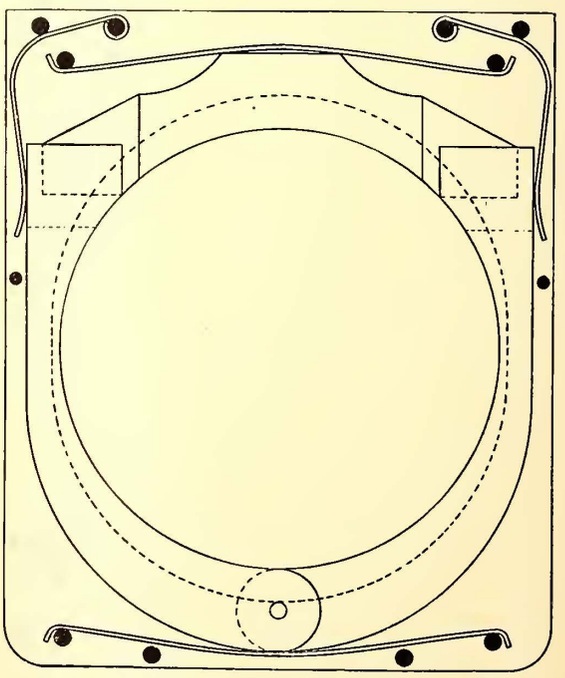


FIG. 4.—DUST-GUARD

way, the cars on this line weighing 48,000 lbs. without load, and requiring unusually good lubrication of the journals.

This is a radical change from lubrication by means of waste, involving principles similar to the self-oiling bearings used on stationary machinery. With an effectual dust guard, such as is placed on journal boxes equipped with this lubricator, the manufacturer believes that there is no reason why it should not be as successful as the ring oiling bearings on stationary machinery.

FINANCIAL INTELLIGENCE

Wall Street, Aug. 19, 1903.

The Money Market

Decided ease in call loans and equally pronounced firmness in the longer time maturities, continue to be the feature of the money market. The ease in call money, which is quoted at 1½ to 2 per cent, reflects the large balance of surplus capital released by the recent liquidation in securities and also the absence of public speculative borrowing. Large advances are reported as having been made to important financial interests to finance recent purchases of stocks, and it is this which in part explains the failure of the loan account to decrease in proportion to what might be expected as the result of the upheaval in the stock market. Loans of this character, however, have for the most part been time loans, and consequently have influenced the rates for time money rather than those for call money. Time accommodations are quoted at 4 per cent for sixty days, 5 per cent for three months and 5½ to 6 per cent for five to six months. Apart from the large borrowing operations referred to on the Stock Exchange, the main factor tending to sustain the loan account has been the huge outtakings of capital by the various railroads in connection with the schemes for improving property and equipment. No more of these transactions have been announced during the past week, but the market evidently has not ceased to feel the effect of the operations previously made public. In Saturday's bank statement the $4,350,100 loan contraction fell far short of the more sanguine expectations, although the showing in this respect was a marked improvement as compared with previous weeks. The Street was unpleasantly surprised, moreover, by a loss of $2,257,000 in cash when the estimates of Sub-Treasury and interior currency movements had indicated a fair sized increase. For this discrepancy no adequate explanation appears, but it was suggested that recent bank mergers might have had some effect in distorting real conditions.

The money situation as a whole seems to be shaping itself in conformity with opinions long ago expressed in this column. The stock market decline has anticipated, and has thereby modified the natural tendency of the season toward a money stringency. Higher rates for time money have already brought down foreign exchange rates to within a short distance of the gold import point, the heavy purchases of securities by Europe being a contributory influence in the same direction. There can no longer be doubt that when our money rates harden still further, as they assuredly will in the course of another month, we shall be able to draw gold freely from abroad. Gold imports will make good in large measure the drafts upon bank reserves occasioned by the crop-moving demands. There will be, of course, no room for any expansion of credits in a fresh Stock Exchange speculation, but in view of the favorable position in the foreign exchanges, and in view also of the fact that the surplus reserve stands $14,000,000 above last year's total, there is reasonable assurance that no further mulcting of existing stock market loans will be necessary. The whole banking condition is extremely healthy, and whatever rise in money rates and lowering of bank reserves may be brought about by the usual autumn requirements, can be looked forward to with complacency.

The Stock Market

This week's very sharp recovery in prices is chiefly significant, because it denotes a greater degree of confidence than has yet existed that the stock market has at length turned the corner. Prices have moved in the manner they usually do when weak speculative holdings have been thoroughly weeded out, leaving securities in strong hands. The usual sign of the culmination of a protracted decline is just such a violent rebound as has been witnessed during the past ten days. According to all accounts, the heads of the financial community came to the decision a week ago that liquidation had gone far enough; that the temper of the rank and file of security holders had become so thoroughly demoralized that a serious panic was likely to ensue unless prompt measures were taken to avert it, and that it was time for them to apply the remedies. Purchases from these high quarters went on in enormous quantity at the opening of last week, and it was their influence which served to turn the tide. The market from the low level of Monday week up to yesterday's close had advanced ten points or more among the active stocks, with much larger gains in numerous specialties. This much, it is agreed, was consistent with the limits of a normal recovery. The question now arises whether attempts will be made to induce a revival of speculation and carry the upward movement further, or whether the market, having recovered its equilibrium, will be allowed to shift for itself. In the latter case some substantial setback should occur, inasmuch as the real demand is not sufficient to support such a rapid upturn in prices. There is no doubt that the idea of another speculation at this season is repugnant to conservative opinion. Such a movement would weaken bank reserves at a time when they are most in need of sustenance, and it would also check Europe's buying, which has been an influential factor of support. Not only this, but the danger would be that recent European purchasers, seeing the opportunity for a quick profit, would unload their holdings, an operation that would not only be unsettling to the stock market, but would tend to destroy the present favorable situation in the foreign exchanges. As pointed out in the foregoing article, the money market must count upon gold imports to make good its losses in the autumn crop movement. With Europe's investment buying of securities to offset our reduced trade balance, we can count with some assurance on drawing the necessary gold from abroad, but should Europe cease to buy and turn seller it would certainly lessen the chance of the home money market obtaining the aid required from foreign capital. These are some of the main considerations why it is advisable for the stock market to go slow. It remains to be seen whether the Wall street leaders will abide by this conservative view.

The local traction stocks have enjoyed their full proportion of the general improvement. The only important specific development in this group was last week's quarterly earning statement of the Manhattan Elevated, which in some respects is the most important that the company has yet published. It shows that along with the increased volume of traffic the ratio of operating expenses under the electrical equipment has been reduced to a much greater extent than expert opinion had predicted. The saving under the new system appears to be nearly a half of a cent on every passenger carried—a truly astonishing exhibit

It is no wonder, under these circumstances, that the rise in the stock has been a violent one. In the case of Metropolitan and Brooklyn Rapid Transit, the technical condition created by a scanty market supply on the one hand and a fair-sized short interest on the other, has been conducive to a particularly sharp recovery.

Philadelphia

The general improvement in speculative circles has made itself felt very decidedly among the Philadelphia traction specialties. In most instances the recovery from the recent low level has carried prices back to where they were two months ago. American Railways has enjoyed the sharpest advance, moving up under active trading from 43 to 47. Buying of these shares has been stimulated by the near prospect of the dividend declaration, at which time it is also expected that a highly favorable statement of the company's operations will be given out. Philadelphia Company common was bid up during the week from 38 to 41 without bringing out much stock. The preferred changed hands at 43¾ and 44. Philadelphia Traction, after selling at 93⅞, advanced to 95½, and Union Traction rose sharply from 42½ to 44. Rapid Transit advanced from 12 to 13½ and fell back to 13. In speculative circles the movement was regarded with suspicion as indicating a desire to distribute stock. The only other noteworthy sales of the week among the traction stocks were Pittsburg Traction preferred at 47½, Consolidated Traction of New Jersey at 62, and Chicago Union Traction at 5⅞ to 6¾.

Chicago

This has been one of the dullest weeks recorded for some time in the market for traction shares at Chicago. There is gratifying evidence, however, that liquidation has run its course here the same as elsewhere. The only incident of importance was the application for a receiver for the North Chicago and West Chicago properties, made in behalf of the bondholders who are not satisfied at the disposition provided under the Union Traction reorganization plan. So far as any effect on the market was concerned, this action seemed to be pretty well discounted. North Chicago sold at

100 and West Chicago at 55, but only for a few insignificant lots. City Railway shares recovered 5 points from 165 to 170, and Union Traction common gained 2½ points from 4½ to 7. Among the Elevated shares the most noteworthy improvement occurred in Metropolitan issues, the common rising from 20 to 24, and the preferred from 57 to 65 on fairly active trading. Other sales for the week included Northwestern common at 20, the preferred at 60, South Side at 97 to 97¼, and Lake Street receipts at 5¾ to 6.

Other Traction Securities

Massachusetts Electric common was the feature of the week in the Boston dealings, gaining 3 points from 21½ to 24½. A large part of the buying in this issue represented covering of short contracts. Massachusetts preferred rose from 80 to 81 and later sold at 80½. West End common went up from 89 to 89¾, but subsequently lost the whole of its gain. Only one transaction was reported in the preferred at 110. Boston Elevated selling ex-dividend sold as low as 136 and as high as 138. Among the Baltimore specialties little change occurred. United Railways common rose a fraction from 10½ to 10⅞, the income bonds went up from 62 to 64¼, while the general mortgage 4 per cents were steady at 92½. The other sales reported comprised Knoxville Traction 5s at 101, Newport News and Old Point Comfort 5s at 100, and City Passenger 4½s at 103¼ and 102¼. On the New York curb the feature of the week was an active inquiry for Brooklyn City Railroad stock, in the course of which the price was bid up from 223 to 240. Following the excellent report of the company, Interborough shares were strong at an advance from 96 to 99. Other sales included American Light and Traction common at 56, Washington Electric common at 9¼, the preferred at 37 to 37½, New Orleans 4½s at 82, New Orleans common at 11 to 11½, and Nassau Electric preferred at 79.

Detroit United was again the active issue in Cincinnati, about six hundred shares changing hands at a range of from 65¾ at the opening to 70 at the close of the week, the gain being steady throughout the week. About 500 shares of Toledo Railways & Light sold at between 21½ and 24. The disinclination of the Toledo Council to grant a new franchise is affecting this issue somewhat. Cincinnati Street Railway was weaker, the range being from 130⅞ to 132, the former the closing figure. A small lot of Miami & Erie Canal brought 7, and a small lot of Elgin, Aurora & Southern 48½. Columbus, Delaware & Marion 5s were the only active bonds, selling at the old price of 101.

Northern Texas Traction was the most active issue in Cleveland, which is not saying much, since less than 200 shares changed hands. These brought 30, which was slightly higher than previous sales. Lake Shore Electric preferred sold at 45, Cleveland & Southwestern preferred 64, and Aurora, Elgin & Chicago preferred 60. Cleveland Electric sold at 72 for a small lot, and Northern Ohio Traction made a new low mark of 17½ for several small lots and then advanced to 13. Stark Electric Railway, a new Cleveland road, brought 28 for a small lot, the first ever sold. The property is a most promising one.

Security Quotations

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

	Closing Bid	
	Aug. 11	Aug. 18
American Railways	43	46½
Aurora, Elgin & Chicago	b17½	b17½
Boston Elevated	135½	137
Brooklyn Rapid Transit	41	47¾
Chicago City	165	160
Chicago Union Traction (common)	3½	5
Chicago Union Traction (preferred)	30	25
Cleveland Electric	72	b72
Columbus (preferred)	102	—
Consolidated Traction of New Jersey	64	61
Consolidated Traction of New Jersey 5s	103½	103
Detroit United	65½	69¾
Elgin, Aurora & Southern	b52	b52
Lake Shore Electric	b10½	b10½
Lake Street Elevated	4¾	5¾
Manhattan Railway	130⅞	135
Massachusetts Electric Cos. (common)	21	24
Massachusetts Electric Cos. (preferred)	80	80
Metropolitan Elevated, Chicago (common)	18	22
Metropolitan Elevated, Chicago (preferred)	55	60
Metropolitan Street	111	116
New Orleans (common)	9	11⅛
New Orleans Railways (preferred)	30	35
North American	71¾	79⅜
Northern Ohio Traction & Light	18	18
Philadelphia Rapid Transit	11¾	12¾
Philadelphia Traction	94	95½
St. Louis Transit (common)	17	19
South Side Elevated (Chicago)	97	96
Syracuse Rapid Transit	25	25
Syracusce Rapid Transit (preferred)	72	73
Third Avenue	111½	114
Toledo Railway & Light	21	22
Twin City, Minneapolis (common)	91	95
Union Traction (Philadelphia)	42⅜	43⅝
United Railways, St. Louis (preferred)	64½	68⅝

a Asked. b Last sale. * Ex-dividend. † $10 paid.

Iron and Steel

The market for pig iron continues somewhat unsettled, although to a less degree than in some time past. A better demand is reportd ed all over the country. In the West sales of 150,000 tons at the prevailing prices are reported, and fair-sized orders have been placed also in the Pittsburg district. Notwithstanding this better buying, however, prices are still being shaded. A cut of 1.50 a ton all around was reported as late as yesterday. Significant of the general uncertainty as to the future, the United States Steel Corporation has postponed placing its tonnage for the final quarter of the year, and it is not clear on what terms this all important business will be arranged. In the products of the higher rank, such as steel billets, tin and sheet bars, the demand is comparatively light, although to offset this it may be noted that steel production is being curtailed. Quotations are as follows: Bessemer pig iron, $18.75 to $19; Bessemer steel, $27 to $27.50; steel rails, $28.

Metals

Quotations for the leading metals are as follows: Copper, 13½ to 13¾ cents; tin, 27¾ cents; lead, 4¼ cents; spelter, 5½ cents.

ARGUMENT ON METROPOLITAN SUIT

Argument on the application of John F. Doyle, a stockholder of the Metropolitan Street Railway Company, of New York, for an order for the investigation of the books of the company, was heard Wednesday, August 12, by Justice McCall, sitting in Part 1 of the Supreme Court. Mr. Doyle alleges that there have been irregularities in the management of the company. Former District Attorney Philbin, on behalf of Mr. Doyle, said that there was no connection between the present action and the Amory fiasco.

De Lancey Nicoll and Paul A. Cravath, of Guthrie, Cravath & Henderson, who appeared in opposition to the motion, through Mr. Nicoll, raised a preliminary objection to the hearing on the ground that as every allegation of Mr. Doyle's had been denied his only application could be for an alternative writ. Justice McCall said he would deal with the case on its merits and hear the argument.

Mr. Philbin, in opening the argument, said his client held 520 shares of stock in the company, and, after an absence from home, his attention was called by his son to the fact that the newspapers had been commenting upon the affairs of the Metropolitan Street Railway Company. Mr. Doyle's 520 shares of stock represented a value of about $60,000, and he had been a stockholder of the corporation since its organization. In 1902 he attended a meeting of the stockholders at which he proposed a motion which was only defeated because the chairman held so many proxies.

Mr. Philbin said he had been retained by William N. Amory and others in proceedings pending at the time, and Mr. Doyle, who had known him for many years, also retained him.

"On my advice," said Mr. Philbin, "he wrote to the Metropolitan Street Railway asking for an explanation with regard to certain financial matters, but received no reply. About ten days afterward, however, a report was sent to every stockholder, including Mr. Doyle, based on the examination of expert accountants, and which was in the nature of a reply to the twelve items in which Mr. Doyle desired information. An examination of this report was carefully made, with the hope that the matters complained of would be satisfactorily explained. It appeared, however, that the investigation, which was made by Mr. Teale, did not cover Mr. Doyle's requests, and it then became necessary for him to apply to the company for leave to inspect its books, which was denied, the president giving as the reason for his refusal that Mr. Doyle had joined in the attack made by Amory

and Braker on the company. As a matter of fact, Mr. Doyle's application was made in good faith.

"This application cannot be considered an attack on the Metropolitan Street Railway Company, and that is shown by the fact that Mr. Doyle owns stock worth now $55,000, his stock a few years ago having been worth $120,000.

"The reason for our application is that several months have elapsed since these charges of mismanagement were made and published, and the directors of the company have never done anything to dispel the uneasiness that exists in the community as to the value of the stock and assets of this company."

Mr. Nicoll in opposing the granting of mandatory writ said there are 2500 stockholders and Mr. Doyle was the only one to apply for a writ. No company, he asserted, has been so thoroughly investigated, and the District Attorney and his experts found nothing wrong after a winter spent on them. Mr. Moore, the company's auditor, denied emphatically all the allegations against the company made by Mr. Amory.

"We deny all charges of mismanagement," continued Mr. Nicoll. "We deny all charges of misapplication, we deny all charges of waste of assets, and we support our denials by the statements of the accountants. The least that can be said of those making these charges are that they are mistaken.

"The experts never examined the books," interrupted Mr. Philbin. "There is nothing to show they did."

"They did," replied Mr. Nicoll. "They spent two weeks examining the books, and then we offered the testimony heard by Justice Scott in the action to break the Interurban lease as proof that the books had been examined."

Mr. Philbin made a short rejoinder to Mr. Nicholl, saying: "Our application is not based on any expert accountant's reports, but on the discrepancies contained in the company's report to the Railroad Commissioners."

Justice McCall then reserved decision.

CONSOLIDATION OF SUBURBAN COMPANIES AT WORCESTER, MASS.

The directors of the Worcester & Southbridge Street Railway Company, the Worcester, Rochdale & Charlton Depot Street Railway Company, the Southbridge & Sturbridge Street Railway Company and the Worcester & Southbridge Development Company, at a meeting Aug. 15, voted to consolidate the companies into the Worcester & Southbridge Street Railway Company, capitalizing the new corporation at $2,000,000. Meetings of the stockholders of the four corporations have been called to act on the matter, but as 4000 of the 5000 shares in them all were represented at the meeting of the directors, there is no doubt of the action being ratified. In order to have more time for his other duties, Wilford A. Bailey resigned as treasurer of the Worcester & Southbridge Street Railway Company, and John A. Hall, treasurer of the Southbridge Savings Bank, was elected to succeed him. Mr. Bailey was selected by the directors as general manager of the consolidated companies. He has had the direction of the building up of all the properties owned by these companies and has been in general charge of their operation.

The directors voted to develop the common carrier business on the line and connection is to be made with the tracks of the New York, New Haven & Hartford Railroad at Southbridge. The rights to engage in this business have been granted by the State and municipal authorities. It was voted, also, to extend the Southbridge & Sturbridge line to Palmer.

All these properties are practically new, the oldest being the Southbridge & Sturbridge Street Railway, which was built six years ago and practically rebuilt last year. The Worcester, Rochdale & Charlton Depot Street Railway Company owns no rolling stock, but cars are operated over its tracks under a traffic agreement with the Worcester & Southbridge Street Railway, which was completed last year. The Worcester & Southbridge Development Company owns Pinehurst Park, which is being developed into one of the finest amusement parks in New England, and Hotel Overlook, in Charlton, a country hotel, which, with the grounds, will cost, it is said, $200,000. The consolidation will centralize the various companies which were being operated harmoniously. The stock will remain practically where it is now, shares in the new company being given for shares in the old in proportion to their value.

San Blas, a seaport town of some 2000 population, in the State of Jalisco, Mexico, is to have up-to-date American electric lighting and traction systems. H. B. Masset, representing California capitalists, is now in Mexico on the matter.

REPORT OF INTERBOROUGH COMPANY FOR QUARTER AND THE YEAR

The Interborough Rapid Transit Company, which operates under lease the Manhattan Elevated Railway Company, of New York, has made public statements of its earnings for the quarter ending June 30, 1903, and for the year ending June 30, 1903. By comparison with the figures of the company for the same periods of the previous year, the increases shown are very heavy. Taking the statement for the quarter, the increase in gross receipts for 1903 was $414,537, with a decrease in operating expenses of $99,017. This makes the total increase in net earnings $513,554. The item of other income, however, shows a decrease for 1903 of $21,100, leaving the increase in total income of $492,454. There is an increase in taxes of $28,714, but the increase in surplus shows the magnificent sum of $463,740. The percentage of operating expenses was further decreased from 49.03 per cent to 39.80 per cent. Turning to the statement for the year, the gross receipts for 1903 increased over 1902 $1,542,188. There was a decrease in operating expenses of $57,791, leaving an increase for 1903 in net earnings of $1,600,217. The item "other income" shows a decrease for 1903 of $278,941. The increase in total income for 1903 was $1,321,276. Interest and taxes for 1903 increased $121,188, leaving an increase in surplus for 1903 over 1902 of $1,200,089. The percentage of operating expenses to gross receipts decreased from 51.74 to 44.73. There was an increase in passengers carried of 31,327,677. The statements follow:

Quarter Ending June 30.	1903	1902
Gross receipts	$3,271,787	$2,857,250
Operating expenses	1,302,089	1,401,106
Net earnings	$1,969,698	$1,456,144
Other income	90,187	111,287
Total income	$2,059,885	$1,567,431
Interest and taxes	684,563	655,849
Surplus	$1,375,322	$911,582
Op. per cent	39.80	49.03
Passengers carried	66,105,436	57,699,248

For the Year Ending June 30.	1903	1902
Gross receipts	$12,208,337	$10,665,911
Operating expenses	5,460,794	5,518,585
Net earnings	$6,747,543	$5,147,326
Other income	346,859	625,800
Total income	$7,094,402	$5,773,126
Interest and taxes	2,820,859	2,699,671
Surplus	$4,273,544	$3,073,455
Operating, per cent	44.73	51.74
Passengers carried	246,587,022	215,259,345

The general balance sheet as of June 30, 1903, follows:

ASSETS

Cost of lease and equipment of subway	5,378,357
Stocks and bonds of other companies	13,527,266
Other permanent investments, real estate	1,738,341
Supplies on hand	550,291
Due by agents of this company, on account of traffic	164
Due by others than agents, on account of traffic	11,311
Due by companies and individuals, on open accounts	68,315
Cash on hand	10,886,248
Loaned on collateral	1,015,000
Manhattan guarantee fund	4,018,811
Prepaid insurance	6,748
Total	$37,180,852

LIABILITIES

Capital stock	$35,000,000
Interest on funded debt of N. Y. Met. and Man. Ry Cos., due and accrued	288,497
Sundries	7,636
Manhattan Ry. Co. lease account	430,920
Due for wages	94,703
Due for supplies, taxes, etc	267,614
Due companies and individuals	10,085
Interest and premium on capital stock	371,073
Taxes in litigation	163,000
Profit and loss (surplus)	547,324
Total	$37,180,852

President Belmont, of the Interborough Company, is quoted as making the following statement regarding the earnings of the Manhattan system: "It is gratifying to the management of the Interborough Company that the Manhattan lease is proving such a success. The surplus over and above liberal expenditures in operation and the 7 per cent guaranteed in the lease for the current year will enable the Interborough Company to carry out the intended improvements in stations, care of structure and equipment and adopt every device within reach of its technical department to insure the safety of the traveling public."

AFFAIRS IN CHICAGO

Almost every day last week there was some more or less startling announcement concerning the affairs of the Union Traction Company. On Wednesday, Aug. 12, two bills were filed in the Superior Court asking the appointment of receivers for the North Chicago Street Railway Company and the West Chicago Street Railway Company. These actions were begun by bondholders in the two companies who declare that the action in the United States Court against the Union Traction Company and the two subsidiary companies will not afford proper protection to the creditors of the two lesser companies.

On Friday, Aug. 14, unofficial announcement was made that more than two-thirds of the stock of the companies was in the hands of Fred H. Rawson, vice-president of the Union Trust Company, and Harry H. Blair, both of whom are members of the protective committee of the underlying companies.

This announcement was followed on Saturday by action on the part of the majority faction in the companies that it was thought practically guaranteed the ratification of the reorganization plan to be acted upon Tuesday, Aug. 18. This action consisted of securing from the Federal Court a restraining order to prevent any interference with a vote upon the propositions of reorganization. This court order, naming as defendants the stockholders opposed to the new lease and their attorneys, representatives and employees, bade them appear in court on Monday to show cause why the order should not be made permanent.

When the attorneys for the minority stockholders appeared in court on Monday, a sensation was sprung. Judge Grosscup said knowledge had come to him that an offer had been made of $100,000 to settle the difficulty. The judge further said that he would call for all the evidence concerning this phase of the matter, and would sift it to the bottom. He made plain the statement that the affairs of the Union Traction Company are in the hands of the United States Court, and that the receivers in charge are there to protect all the stockholders. The injunction order restraining the minority stockholders from interfering in any way with the reorganization meeting of the traction companies called for Tuesday was made permanent.

At the meeting on Wednesday, at which 70 per cent of the stockholders of the underlying companies was present, it was unanimously agreed to accept the terms as suggested by the traction people. This contemplates a reorganization and a tripartite agreement.

FIFTY-MILLION-DOLLAR HOLDING COMPANY FOR SOUTHERN CALIFORNIA LINES ABANDONED

The holding company with a capital of $50,000,000 for the Hellman and Huntington electric railways in Southern California has been abandoned. Senator W. A. Clark of Montana and E. H. Harriman were to have held a minority of stock in the proposed company, Hellman and Huntington keeping the control. The interested parties, for some reason not made public, have, however, decided not to disturb the existing four companies which represent the Hellman and Huntington lines. They comprise the Pacific Electric Railway Company and Interurban Electric Railway Company, with $10,000,000 each of stock and bonds; Los Angeles Street Railway, with $5,000,000 each stock and bonds, and the Los Angeles Traction Company, recently bought by the Pacific Electric Railway Company for about $2,000,000.

The Los Angeles Traction Company was to have been used by Clark and Harriman as the nucleus of a rival electric system in the south. They, however, finally agreed to let Huntington and Hellman buy it. They also arranged to enter the Huntington and Hellman roads as investors in one big holding company for the four roads. Now that the latter has been abandoned it is understood Clark and Harriman will take as an investment a certain amount of stock and bonds in the Pacific Electric and the Interurban Electric Companies.

EXHIBIT BOOTHS AT SARATOGA

A number of manufacturing companies which are planning to make exhibitions at the coming convention at Saratoga Springs have already made arrangements with the Allen-Bates Company, which makes a business of constructing booths of this kind. The convenience of having a professional firm undertake the work, as well as the better results usually secured, makes the fact that this firm is engaged in this work of interest. Its headquarters are at 10 North Market Street, Boston.

ELECTRIC RAILWAY TAXATION IN INDIANA

The State Tax Board of Indiana has completed its assessment of electric lines and the report shows an increase of $2,374,450 over the appraisement of last year, making a total valuation placed on such roads of $12,013,762, distributed as follows: Main track, $10,313.795; second main track, $68,890; side track, $75,657; rolling stock, $347,109; improvements on right-of-way, $378,285. There are 754.17 miles of main track and 26 miles of side track in the State.

The appraisement of the Indianapolis Street Railway Company remains at $32,000 per mile and the Indianapolis Terminal & Traction Company is assessed on 29 miles of track at $3,500 a mile. The Union Traction Company is assessed at $15,000 per mile, and the Indianapolis Northern at $5,000 per mile. The board reduced the assessment of the Indianapolis & Eastern Company from $11,000 to $4,000 a mile. The company has built 13 miles since last year. The Indianapolis, Columbus & Southern (the Greenwood line) was increased from $9000 to $11,000 per mile. The three new lines that have come into Indianapolis since last year were assessed as follows: The Indianapolis & Martinsville line, $7,000 per mile on 13 miles and $3,000 on 14 miles; the Plainfield line, $9,000 a mile on 12 miles, and the Shelbyville line, $8,000 a mile on 26 miles of road.

WORK BEGUN ON TUNNEL EXTENSION ON BROADWAY, NEW YORK

Work was begun last week by the Degnon-McLean Construction Company, sub-contractors, on what probably is the most important and difficult section of the subway—the extension from the City Hall, Manhattan, down Broadway to Bowling Green to connect with the extension under the East River to Brooklyn. Lower Broadway, lined with sky-scrapers, and on which traffic is terribly congested, presents a problem not encountered anywhere else along the route of the entire line. But even beset with these difficulties the contractors plan to carry on the work so as not to interfere with ordinary traffic from 8 A. M. to 6 P. M. Nearly all of the work will be done at night. The contract with the city requires that two gangs of men, each working eight hours, must be used.

The contractors intend to use the "slice" system, which was employed in Boston. They will work from two shafts sunk in the sidewalk—one at Trinity church and one at St. Paul's The framework for the shaft structure has been erected in front of St. Paul's Chapel. When completed this structure will cover Broadway like a shed. The supports on either side of Broadway are heavy 30-ft. beams. There will be twenty-six feet of head room over the trolley tracks. A 6-ft. passageway will be left in front of St. Paul's and a somewhat larger one in front of the Park National Bank, on the other side of the street.

When the shed is up the roof will be used as a dump for the buckets which will bring the excavated material up from the shaft. The dirt will be put into carts by a chute from this platform. Two openings in the sidewalk will be made at this place, each 6x20 ft. They will be boarded in. It is thought that a third shaft will be needed between Trinity and St. Paul's, in which case it will be put down in the neighborhood of Liberty street. The material used in the construction of this tunnel will also be taken in through these shafts. The street will be torn up at night where the contractor wants to work, but will be boarded over and restored for traffic by 8 o'clock in the morning.

The officers and enlisted men of the Twenty-Third Regiment, N. G. S. N. Y., with headquarters at Brooklyn, were the guests of the management at Manhattan Beach a few days ago. The question of transporting the regiment fell to the management of the Brooklyn Rapid Transit Company, and was solved by Superintendent Edwards, of the elevated division of the company, who made up a train of ten motor cars, probably the longest electric train ever operated.

THE COLORADO ELECTRIC LIGHT, POWER & RAILWAY ASSOCIATION

As a result of a very enthusiastic meeting of electric lighting, power and street railway men in Denver, Col., on Aug. 12, the Colorado Electric Light, Power & Railway Association was organized. The meeting had been called by George B. Tripp, of Colorado Springs, and representatives were present from nineteen companies operating in Denver, Colorado Springs, Pueblo, Greeley and other points in the State. Through the courtesy of Henry L. Doherty, the meeting was held in the rooms of the Denver Gas & Electric Company. J. F. Vail was made temporary chairman, and a constitution and by-laws were adopted, subject to future correction. The following permanent officers were chosen to serve until the first annual meeting: J. F. Vail, general manager Pueblo & Suburban Traction & Lighting Company, of Pueblo, president; William Mayher, manager Greeley Power & Light Company, of Greeley, vice-president; George B. Tripp, general manager Colorado Springs Electric Company, of Colorado Springs, secretary and treasurer. The headquarters of the association will be in Colorado Springs, and annual meetings will be held on the last Wednesday in October. This will bring the next annual meeting on October 28, and it will be a two-days' session. The convention will be held in Denver, and papers on topics of interest to the members will be presented, while the social feature will not be neglected.

The association begins its existence with very promising prospects and the officers are confident that nearly all of the fifty-five companies in the State will become members. Dues will vary from $10 to $25 a year, according to the population of the city in which the company operates. The object of the association is "to foster and promote the common interests of its members and to advance scientific and practical knowledge in all matters relating to electric light, power and railway companies; also to establish cordial and beneficial relations with kindred associations and between the manufacturers of apparatus and the purchaser."

WATER POWER DEVELOPMENT AT COLUMBUS, GA.

The industrial development of Columbus, Ga., promises to receive a substantial impetus before long by the utilization of another water-power of considerable magnitude on the Chattahoochie River. A large tract of land about 3 miles from the centre of the city on both sides of the river has been acquired by Messrs. Stone & Webster, of Boston, who are operating the street railway system of the city, and the plan is to donate manufacturing sites free of charge and furnish power from the water-power plant at $15 per horse-power. Street car facilities are to be established connecting with the lines of the city, and shipping can be done on the several steam railroads converging at Columbus and on the Chattahoochie River, the city lying at the head of navigation. The plant is to be developed for 10,000 horse-power under a head of 49 ft., and if the flow of water should at any time prove insufficient, additional power is to be developed or storage dams built on the river above the city, rights having also been secured for this purpose for perhaps 12 miles or more toward West Point. From that city to Columbus, a distance of 34 miles, there is a fall in the river of 362 ft., and 120 ft. of this occurs in the last 4 miles above navigable water. The power within the city limits has long been utilized and a few years ago the Columbus Power Company built a plant just above the city. The proposed development will require a long dam, but its height will probably not be much over 12 feet, being located at the head of a long fall which will give the remaining 37 ft. of head.

NEWARK & HACKENSACK TRACTION COMPANY TO BE SOLD

The Newark & Hackensack Traction Company's railway, franchise and property are to be sold at the Sheriff's office, Hackensack, N. J., on Sept. 1 at 3 p. m. The sale is brought about by the Guaranty Trust Company, of New York, and will be conducted by Senator Edmund W. Wakelee as special master in chancery.

This traction company succeeded the Union Traction Company, which built the greater part of the line several years ago. After its reorganization it passed into the hands of capitalists represented by William C. Giles. The road now extends from Hackensack to Arlington, a distance of 12 miles, and passes through Hasbrouck Heights, Wood Ridge, Carlstadt, East Rutherford, Rutherford, Lyndhurst, Kingsland and North Arlington, connecting in the last named place with the Newark lines of the Public Service Corporation.

A few months ago the New Jersey & Hudson River Railway & Ferry Company secured a controlling interest in the road through purchase of its bonds and stock, and an extension was built connecting the Hackensack line with the Newark line at Hasbrouck Heights. It is said that the residents along the line desire the New Jersey & Hudson River Railway & Ferry Company to acquire full title to the property, as they believe that this will result in improved service.

OFFICERS OF RAILWAYS & LIGHT COMPANY'S PROPERTIES MEET IN ANNUAL SESSION

The first annual meeting of the general managers, superintendents and accountants of the Railways & Light Company of America was held at Norfolk, Va., early in August. Some fifty or sixty persons were in attendance at this meeting. C. H. Harvey, general manager of the Knoxville Traction Company, was selected as presiding officer during the business sessions. The election of the permanent officers resulted as follows: E. L. Bemiss, of Richmond, Va., president; C. H. Harvey, of Knoxville, vice-president; Miss Crump, of Richmond, secretary. The business session ended with a banquet. Among the papers presented were: "Transfers, Their Use and Abuse," by C. H. Harvey, general superintendent of the Knoxville Traction Company; "Are Trailers Satisfactory During Rush Hours?" by J. T. Nyhan, superintendent of the Macon Railway & Light Company, of Macon, Ga.; "Relative Merits of Sliding Scale and Absolute Scale in Payment of Wages of Motormen and Conductors," by H. H. Carr, general superintendent of the Hampton & Newport News branch of the Norfolk, Portsmouth & Newport News Company; "Personal Injuries and Damages and Settling the Same," by E. C. Hathaway, general manager of the Norfolk, Portsmouth & Newport News Company, of Norfolk, Va.; "Bureau of Publicity," by D. P. Campbell, press agent, Norfolk, Portsmouth & Newport News Company, Norfolk.

PROJECTED RAILWAYS IN CALIFORNIA, MISSOURI AND MEXICO

The Western Electrical Supply Company, of St. Louis, Mo., is furnishing a complete equipment, including everything from cars to spikes, for the San Jose & Los Gatos Railway Company, to be operated from San Jose to Saratoga, to Pacific and from Congress Springs to Los Gatos, Cal. The road will be 18 miles long, 12 miles of which have already been completed. The contracting company is supplying Westinghouse apparatus, including rotary converter, with a Gould storage battery of 225 cells and a 22 kw regulating booster. The cars are to be of the steam road type for a speed of 35 miles an hour. This railway expects to do a heavy freight business, and will be ready for operation about Oct. 15. This railway will be run through the Santa Clara Valley, known as the best fruit district in California. The company expects to be able to build about 30 miles more of road in the near future.

At Auguascalientes, Mexico, the same contractor is to supply all material and rolling stock for the local railway with the exception of the engines. This road will be about 8 miles in length. Westinghouse apparatus is to be furnished. The cars will be of the open summer type, Brill full convertible and California type with closed centers. This road expects to do a heavy freight business, and will be in operation about the first of December.

The Cape Girardeau & Jackson Interurban Railway Company, Jackson, Mo., is to be completely equipped by this firm, using Westinghouse generators with rotary converter stations. The railway company will also furnish light and power for both cities. The cars will be of the steam road type for speeds of 35 to 40 miles an hour, and will do general express, freight and passenger business. The road is to be about 15 miles long.

H. S. Doyle, manager of the Western Electrical Supply Company's Street Railway & Mining Department, is consulting engineer for all these railways.

The steam railroads in the Indiana gas belt have begun to discard printed card way station tickets. The Big Four is taking the initiative in this, and hereafter blank forms will only be used between gas-belt way stations. The card tickets have stood, almost undisturbed, in the racks for a year or two, and it is found advisable to get them out of the way. The Pennsylvania is doing a very meagre local passenger business between Anderson and Elwood, and the Lake Erie & Western has lost most of its local business between points where it is paralleled by the electric lines. —Indianapolis News.

BROOKLYN BRIDGE TERMINAL AND MUNICIPAL OFFICE BUILDING

Commissioner of Bridges Lindenthal, of New York, has had plans prepared for the proposed Brooklyn Bridge Terminal and city offices on Manhattan Island. A 42-story building is contemplated, with trolley loops and other tracks in the lower stories or levels. This enormous terminal station will extend up as far as Duane Street, and provides for five stories of city offices. It would involve an expenditure of $50,000,000 ultimately, and $9,000,000 now. The building will be carried out on the same architectural design as the new Hall of Records, and the plan provides for the construction of the campanile up to that level. The campanile proper, with its thirty-seven additional stories, is to be used for office purposes, and to house city departments. The full height of the campanile, as projected, will be 650 ft., giving in all 400,000 sq. ft. of office room. The cost of $9,025,825 for this terminal station does not include the campanile above the roof of the base, or a height equal to that of the Hall of Records. The cost of completing the tower would be $1,468,800 more.

STREET RAILWAY PATENTS

STREET RAILWAY PATENTS ISSUED AUG. 11, 1903

735,743. Side Bearing for Railway Car Trucks; H. W. Fowler, Chicago, Ill. App. filed Jne 15, 1903. The roller between the upper and lower members has a corrugated surface which engages with similar corrugations on the two members. This affords larger bearing surface and prevents flattening.

735,826. Switch Operating Mechanism; T. Rundorff, Burlington, Iowa. App. filed Feb. 9, 1903. A swinging segment having a lug, is attached to the platform and can be thrown downward by the foot to bring the lug into position to strike a lever in the road bed, and thus move the switch.

736,006. Traveling Connector for Third Rail Electric Systems; J. W. Perkins, San Jose, Cal. App. filed Sept. 23, 1902. The third rail is in a depression of the roadway between the two traction rails.

736,050. Electrical Signaling System; J. L. Wreen, Washington. D. C. App. filed May 11, 1903. Details of a block signaling systems for trolley roads.

736,055. Electromagnetic Railway Switch; R. A. Baldwin, South Norwalk, Conn. App. filed Dec. 18, 1902. An improvement on the "Baldwin" switch, wherein the switch point is locked in both positions and automatically released when the reversal of the switch takes place.

736,063. Electrical Switch; R. L. Border, Pittsburg, Pa. App. filed March 24, 1902. Details of circuit closer attached to the trolley wire.

736,120. Electric Brake; G. A. Le Fevre, New York, N. Y. App. filed June 21, 1902. Independent motors for setting the brake mechanism are applied to each car, the motors being all in one circuit and provided with means for automatically cutting out any motor independently of the others, as a predetermined pressure of its brakes is reached.

736,190. Cast Steel Wheel; T. B. Zell, Reading, Pa. App. filed May 25, 1901. A high-grade steel rim is cast around a low-grade steel hub and web.

736,318. Four Wheel Swing Fulcrum Truck; B. R. Van Kirk, Philadelphia, Pa. App. filed March 21, 1903. The two axles on a single truck are mounted to assume a radial position in rounding curves.

PERSONAL MENTION

MR. JILSON J. COLEMAN, consulting engineer, has moved his office at 57 Broadway, New York.

MR. E. F. GOULD, formerly of the General Electric Company, has been appointed electrical engineer of the Aurora, Elgin & Chicago Railway Company.

MR. SYLVESTER POTTER, of the Aurora, Elgin & Chicago Railway, has succeeded Mr. Thomas Farmer as master mechanic of the Detroit United Railway Company. Mr. Potter held a similar position with the Toronto Railway before going to the Aurora, Elgin & Chicago Company, and is known as a man of thorough methods and a master of his craft.

MR. JOSEPH O'HARA, for a number of years superintendent of the Cleveland & Eastern division of the Eastern Ohio Traction system, has resigned to accept a similar position with the Aurora, Elgin & Chicago Railway. On Aug. 6 a number of the employees of the Eastern Ohio Company met at the operating offices of the company and presented Mr. O'Hara with a handsome gold watch.

MR. JOSEPH T. McNARY, president of the Logansport, Rochester & Northern Traction Company, Logansport, Ind., assumed the position of general manager of the Logansport & Wabash Valley Traction Company, having control of the electric line between Wabash and Logansport, and also the local lines in Logansport. He succeeds Mr. L. T. Lew, who returns to his home in Connecticut. Mr. E. C. Folsom, who has been the manager of the Logansport line, goes to Ft. Wayne as manager of the local railway.

MR. T. FIERZ, who has recently been appointed chief electrician to the Brush Electric Engineering Company, Limited, of London, brings with him from the Continent a high reputation for technical ability. A Swiss by birth, Mr. Fierz received his early training at the Polytechnic High School of Zurich, where he took his diploma with honors as mechanical and electrical engineer. His first engagement was with Messrs Brown, Boveri & Company, of Baden, Switzerland, with whom he was chiefly occupied with the design of polyphase alternators. Mr. Fierz afterward spent some time with a French firm, which he left on being offered the position of designer for continuous-current machinery at the Charleroi works of the Société Electricité et Hydraulique. Subsequently, and in succession to Mr. Heyland, one of the most eminent Continental designers, the supervision of the alternating-current department was added to his duties, and a considerable number of single and polyphase generators, synchronous and asynchronous motors, etc., were developed during his stay. The result of Mr. Fierz's work at Loughborough will, no doubt, soon be practically appreciated in the British market for the latest types of generators, motors and other electrical apparatus.

T. FIERZ

MR. A. J. J. PFEIFFER, who for some time has been connected with Messrs. Dick, Kerr & Company, in London, Eng., is about to visit the United States before proceeding to Calcutta, India, where he will assume the position of assistant manager of the Calcutta Tramway Company, whose extensive lines have recently been electrified. Mr. Pfeiffer, after graduating from Yale in the class of 1894, entered the employ of the General Electric Company at Schenectady, N. Y., and remained with that company until 1898, when he went to Europe as electrical engineer for the Compagnia Thomson Houston della Mediterranie, an affiliated company of the General Electric Company, whose headquarters are in Paris. Shortly afterward he was called to Milan in the interests of this company to work up and carry out the electric transformation of the important steam railway, the Milan-Gallarate-Varese-Porto Ceresio, which is one of the first and longest third-rail high speed electric railway installations in Europe. Mr. Pfeiffer will return from the United States to London in time to leave on Oct. 1 for Calcutta.

MR. GEORGE FLETT, who has for many years been the managing director of Messrs. Dick, Kerr & Co., Ltd., of London, now allied with the English Electric Manufacturing Company, has been recently establishing a reputation for himself as a yachtsman. Mr. Flett has been an enthusiastic yachtsman for a great many years, and this season is the fortunate owner of the yacht "Evelyn," a schooner of 246 tons, which has been specially built for him. Recently Mr. Flett raced Mr. C. T. Caley, the chairman of Dick, Kerr & Company, in his schooner yacht, "Adela," of 245 tons register, across the German Ocean, and afterwards in a number of races in the Baltic, under the auspices of German clubs and in German waters. Mr. Flett was fortunate enough to win a cup from the Kaiserliche Club, and both he and Mr. Caley and the owners of other British yachts who were taking part in the races had the honor of dining with the Kaiser on board the royal yacht "Hohenzollern." Yachting is a sport in which kings and merchants alike take pleasure, and Mr. Flett has stated, with a great deal of satisfaction, that the Kaiser during the whole of the races was most cordial in his relations with owners of other yachts and entertained them right royally on his own yacht, placed himself on a pleasant footing with them, and, in fact, was a right good fellow while the festivities lasted.

NEWS OF THE WEEK

CONSTRUCTION NOTES

JONESBORO, ARK.—The Mobile Rapid Transit Company has been incorporated, with a capital stock of $19,000. W. W. Cate, president; Rudy Copeland, secretary; J. H. Little, treasurer.

ALAMEDA, CAL.—Another application to operate an electric line over the north and south side lines now operated by the Southern Pacific has been filed with the executive committee of fifty chosen by the City Trustees to assist them in settling the matter of local franchises. P. N. Beringer, as agent of Eastern parties, submitted the application. It is stated that the Eastern people are the firms of Mechem, Mitchell & Company and Kay, DeWolf & Company, both of New York.

EUREKA, CAL.—Articles of incorporation of the Humboldt Transit Company have been filed. The purpose of the company is to build 20 miles of electric railway in Eureka and an additional 54 miles to other towns in Humboldt County. The capital stock is $300,000, of which $75,000 has been subscribed. The directors for the first year are: J. C. Bull, Jr., of Eureka; George Henderson, of Oakland; R. W. Bull and John C. Bull, of Arcata, and Charles P. Cutten, of Eureka.

LOS ANGELES, CAL.—C. S. Campbell-Johnston says that his electric road from Pasadena to Garvanza, by way of California Street, will be ready for traffic by Jan. 1. Since the purchase of the Los Angeles Traction Company it had been generally thought that this road would not be completed, as Mr. Huntington is the man behind the enterprise, and it is thought that the Campbell-Johnston franchise was procured merely to keep the Traction out of Pasadena.

LOS ANGELES, CAL.—Col. J. W. Eddy has been granted a right of way through Griffith Park for his electric railway to connect with the inclined railway he is to build there.

LOS ANGELES, CAL.—Sub-stations are being built by the Pacific Electric Railway Company at Arcadia, Long Beach, Dominguez, Watt, Eastlake Park and Laguna. The company will also build $2,500 station buildings in the Mission style of architecture at the junction of the Pasadena and Monrovia and the Long Beach and Whittier lines.

MONTEREY, CAL.—R. C. Smith has been awarded the contract to construct and operate a single or double-track electric street railway on the following streets: Commencing at the intersection of Franklin and Taylor Streets, thence along Franklin Street to Calhoun Street; thence along Calhoun Street to the United States military reservation.

REDWOOD CITY, CAL.—Reports state that Charles Clark & Henry Dowie, of San Mateo, have applied to the Board of Supervisors for a franchise to construct an electric railway from San Mateo over the mountains to Half Moon Bay. The Board will receive bids for said franchise Sept. 7.

SAN JOSE, CAL.—The track of the San Jose-Los Gatos Interurban Company has been laid as far as Saratoga, and the construction train is now running to that point. Ballasting is now being rushed, and a trial trip will be made over the line shortly. Work on the line between Saratoga and Los Gatos will now be taken up. A power house near Saratoga and car houses in this city will be built at oice.

VALLEJO, CAL.—An ordinance has been passed granting a franchise to the new electric railway in Vallejo, and work on the new line of the Vallejo, Benicia & Napa Railway will begin in sixty days and be completed in one year.

GREELEY, COL.—Application has been made to the City Council by George J. Spear to secure a twenty-year franchise for an electric railway to pass through the city. The different lines projected are: One from Greeley to La Falle, a distance of 7 miles; another from Greeley to Seeley's Lake, a pleasure resort 5 miles from town, and one connecting the city with Ault, 8 miles distant.

PUEBLO, COL.—The surveying corps of the Rapid Transit Company in charge of R. L. Kelly, has about completed preliminary surveys for the electric railway projected to connect Pueblo with the Beulah Valley, 30 miles southwest. The line will be located at once. The subscriptions of the citizens of Pueblo to the stock of the company are progressing favorably under the auspices of the Pueblo Business Men's Association, and it is expected that work will be commenced on the line by Oct. 1. The actual road will be about 30 miles in length, and will be built on a one-per-cent grade the entire distance. There will be about 10 miles of additional track in Pueblo and for sidings. The Beulah Valley is rich in agriculture, live stock, mining, marble and lime rock, and is noted as a summer resort. The railway expects to do a large freight business, and already has assurances of a business of 1000 tons a day. The road will start at the post office in Pueblo, and the company's franchises will allow it to build to the western limits of the city, should it desire to extend its line to Florence and Canon City. The source of power for the operation of the road has not been determined upon yet, but it is possible that a station will be located at the coal mines in the vicinity of Florence and high-tension power lines built to sub-stations on the road. The following-named gentlemen are officers of the Rapid Transit Company: George Peck, of Cincinnati, Ohio, president; John J. Burns, of Pueblo, vice-president and secretary; James N. Carlisle, of Pueblo, treasurer. The constructing company is known as the Pueblo & Beulah Realty & Construction Company, and W. A. Beatty, room 17, Opera House Block, Pueblo, is the president and general manager.

ODESSA, DEL.—The electric railway between Odessa and Middletown, in New Castle County, is about completed and will probably be opened between the two towns in a few days. The track laying has been finished in the rural districts, the men being now employed in grading the streets of the two towns. The feed-wire has been put in along the entire route. It is thought that the line will be extended through Kent and Sussex Counties.

WILMINGTON, DEL.—The new line of the West Chester, Kennett Square & Wilmington Railway Company has been put in operation, and the cars are running as far as Toughkenamon, Pa. They will be run to West Chester as soon as the upper part of the road can be completed.

ST. AUGUSTINE, FLA.—It is reported that Jacksonville capitalists will soon make application to the City Council for the passage of an ordinance granting franchises for the construction of an electric railway here.

ATLANTA, GA.—The County Commissioners have granted the Piedmont Electric Company a franchise to construct an electric railway between Atlanta and Roswell.

ATLANTA, GA.—The City Council has passed an ordinance granting the Central Passenger Railway Company the privilege of building an electric railway on Virginia, Adriatic and South Carolina Avenues. The company is headed by William McLaughlin.

CHICAGO, ILL.—Reductions in assessments aggregating $2,940,500 were granted the Chicago Union Traction Company and the Chicago Consolidated Railway Company by the Board of Review Aug. 17. The assessment against the former was cut from $10,125,000 to $9,125,000, nearly all the reduction accruing to the West Side lines connected with the company. To the Chicago Consolidated Company a reduction from $3,940,500 to $2,000,000 was granted, cuts being made in each town traversed by the roads of the company.

GALESBURG, ILL.—Articles of incorporation have been filed in the office of Clerk Gamble, of the Galesburg, Monmouth & Rock Island Railway, which contemplates constructing an electric railway beginning at Galesburg and extending through Monmouth and terminating in Davenport, Ia. The capital stock of the concern is placed at $100,000, which is divided into 1000 shares of $100 e ach. George F. Duncan and Edward Woodman, of Portland, Maine; W. B. McKinley, J. E. Johnston and Charles Zilly, of Champaign, Ill., are the incorporators and the first board of directors.

OTTAWA, ILL.—The Northern Illinois Light & Traction Company, Ottawa, capitalized at $250,000, has been incorporated to operate a system of street railways and furnish light. The incorporators are: Louis W. Hess, Jacob I. Warner, Charles E. Woodward.

DECATUR, ILL.—The Decatur, Tuscola & Champaign Interurban Railway has been incorporated, with headquarters at Decatur, Ill. It will construct an electric railway to connect with the McKinley line, now building through Springfield to St. Louis.

LINCOLN, ILL.—The Lincoln Street Car & Heating Company has been incorporated in New Jersey, with $110,000 of authorized capital stock. The general belief is that the company will succeed to the property of the Lincoln Street Car Company. The incorporators are: Louis B. Dailey, Warren U. Akers and H. O. Coughlan.

TAYLORVILLE, ILL.—J. N. C. Shumway and Benjamin Sharpe are pushing a scheme to build an interurban electric railway from Taylorville southeast through Assumption, Shelbyville and beyond.

DECATUR, ILL.—A number of men at Champaign, Tuscola and Decatur are interested in a project to construct an interurban electric railway from Champaign south to Tuscola and thence to Mattoon and Charleston. A line will also be constructed from Tuscola to Decatur. Among the promoters are the Messrs. Campbell, wealthy land owners of Champaign County; Attorney Ray, of Champaign; Messrs. Wallace, Tuscola bankers, and Attorney Charles Eckert.

QUINCY, ILL.—At the annual meeting of the Quincy & Western Illinois Railway Company, which has franchises for building interurban lines in Quincy, the franchises voted the company by the city of Quincy were accepted and Gen. A. B. Nettleton, S. H. Bracey, F. E. Lonas, James Potter, W. A. Howard, L. J. Highland and John Tiease were elected directors. The meeting voted to increase the capital stock from $500,000 to $3,500,000, and to authorize a bond issue for $3,500,000.

STERLING, ILL.—The Columbia Construction Company is pushing the work of building the Sterling, Dixon & Eastern Electric Railway from Sterling to Dixon. Over a mile of track has already been laid east from the city limits, and the prospects are now good for the completion of the entire work before winter. Nearly all of the material is here, and the balance is on the way. The poles are being set rapidly and the wire has arrived.

VIRDEN, ILL.—The city of Virden has granted a franchise to the Decatur, Springfield & St. Louis Electric Railway to run its lines on the streets of Virden on the east side of the square. The City Council of Carlinville is discussing an ordinance whereby the same company may have the use of certain streets in that place. It now appears that the interurban railway is a sure thing.

ANDERSON, IND.—W. B. Campbell and others are projecting an electric railway from Anderson through Noblesville to Lebanon. Mr. Campbell is procuring right of way and franchises, and says the financing of the road has been arranged for. The line would complete a great cross State line north of Indianapolis and connect with nearly a dozen lines running north, east and west.

ANDERSON, IND.—Ground has been broken for the new interurban line from this city to Elwood by the Indiana Union Traction Company. The line will add 20 miles to the company's system. F. N. Stillwell has the contract to construct the grade and track work. The line is to be completed in 90 days.

ELKHART, IND.—The St. Joseph Valley Traction Company, of which H. E. Bucklen, of Elkhart, is the principal backer, and which is endeavoring to break into South Bend, has filed a petition for a franchise to cross La Grange County in the direction of Angola.

GREENSBURG, IND.—It is said that all the capital required has been subscribed for building the Madison, Greensburg & Indianapolis Traction Company's line. The line will connect Madison, Rexville, Versailles, Osgood, Napoleon, Greensburg and other towns. The length of the line is 49 miles.

HAMMOND, IND.—Russell B. Harrison is asking a franchise of the City Council for an interurban line from Michigan City to Hammond. The South Chicago Electric Street Railway Company is opposing the grant.

INDIANAPOLIS, IND.—The Commissioners of Marion County have granted to the Indianapolis & Southwestern Traction Company a franchise to construct a single or double track from the city limits along the Bluff Road to the south line of Marion County. The company will build a line to Martinsville via Waverly. It is the purpose to extend the line to Vincennes and Evansville.

INDIANAPOLIS, IND.—The Indianapolis & Plainfield Electric Railroad has not, so the officers say, abandoned its plan to build a spur off its Greencastle and Brazil extension from Cartersburg to Danville. It is announced that the work of pushing the line on west from Plainfield has been taken up again and that it will oe carried through to Greencastle and put in operation thus far early next year. It will be completed into Brazil for Terre Haute connections next summer.

KOKOMO, IND.—The City Council has passed an ordinance granting the Kokomo, Marion & Western Traction Company the privilege to lay a double track on Main Street, from the south suburbs to the north side of the Court House Square.

KOKOMO, IND.—"Electric trains will be running between this place and Greentown by Sept. 1, and on to Marion within six months," says President Mariott. "I am satisfied," says he, "that we hold the record for fast work on an electric line. In four months we made the survey, bought the right of way, graded 14 miles and laid 5 miles of track, and in less than thirty days will have trains running."

LA GRANGE, IND.—The Council has granted a franchise to the St. Joseph Valley Traction Company.

LOGANSPORT, IND.—The Frankfort-Logansport Traction Company, composed of Frankfort and Logansport capitalists, which proposes to build an electric railway between the two cities, has been granted an extension of six months, in which to begin construction work. This will give the company until Jan. 11, 1904, to start the work of building.

MUNCIE, IND.—The trouble over the location of the Indiana Union Traction Company's double-track entrance in this city is growing more complicated. The general sentiment is that the city wants all the traction lines it can get, but nobody wants the tracks on his street. The company has decided to abandon the building of its big terminal station in Muncie until the matter is settled. The ordinance passed is not acceptable to the company.

RICHMOND, IND.—The Council has granted a franchise to the Richmond & Northwestern Traction Company. The provisions are not what the company wanted, but are in the main the same as granted to other companies. The two points on which the franchise was held up so long were the crossing of the Doran bridge and the clause which permitted the company's lines to traverse streets occupied by the local company. The franchise provides that no cars shall be run over the bridge heavier than the estimated capacity of the bridge as fixed by the civil engineer and an expert employed for that purpose. The franchise grants the use of certain streets on which the local company operates, but in order to use them the company will have to make traffic arangements with the Richmond Company. The term of the franchise is thirty-five years.

SHELBYVILLE, IND.—The County Commissioners have granted the Indianapolis & Cincinnati Traction Company a franchise permitting it to construct a line through the northern part of Shelby County.

VINCENNES, IND.—S. N. Chambers, president of the Vincennes, Petersburg & Jasper Traction Company, announces that he heads a syndicate of Cincinnati, Cleveland and Indianapolis capitalists that will purchase and combine the Vincennes Street Railway Company with the Southern Indiana Traction Company.

WABASH, IND.—Jilson J. Coleman, of New York, and John C. Calhoun have recently put through the deal to finance the Indiana & Northern Railway. J. G. White & Company, of New York, have the contract to build the road. It will be open for operation early in the spring of 1904. The terminals of the road are Marion and Wabash, Ind., separated by a distance of 20 miles. This road forms the connecting link between Indianapolis and a large center of population in the northern part of Indiana, connecting with the Union Traction Company lines at Marion and with the Wabash & Logansport Railway at Wabash.

MUSKOGEE, I. T.—The City Council has granted a street railway franchise to C. N. Haskell and W. R. Eaton. The plans anticipate the building of about 6 miles of street railway. The Muskogee Traction Company will be organized to carry out the project.

DUBUQUE, IA.—The Dubuque Northern Railway Company is surveying a route for an interurban electric railway from Dubuque to Greeley, in Delaware County, about 30 miles north and west of Dubuque. The surveyors have met with considerable difficulty at some places owing to the roughness of the country. From Greeley the proposed route is westward a few miles and then northward to Fayette, a distance of about 32 miles. Fayette is a point on the Milwaukee line near the center of Fayette County. The Dubuque Northern Company also proposes to construct several other interurban lines out from Dubuque, both in a northerly and southerly direction.

KALONA, IA.—Articles of incorporation have been drawn by the Iowa City, Kalona & Washington Railway Construction Company. The plan of the company is to build to connect Iowa City, Kalona and Washington.

MOUNT PLEASANT, IA.—J. O. Ball, Joseph Green and Henry Traut have been voted a franchise for an electric railway here.

TABOR, IA.—President Robert McClellan, of the Tabor & Northern Railway Company, a road extending from Tabor, Fremont County, to Malvern Mills County, Iowa, a distance of 8 miles or 9 miles, has been inspecting the road, with a view to installing electricity as the motive power in place of steam. He has been considering the matter for some time, and has now decided that the time has arrived to make the change. It is also a part of the programme to run a train each way every hour, instead of two a day as at present.

OELWEIN, IA.—The officials of the Oelwein & Northeastern Interurban Railway Company are preparing to commence surveys just as soon as the Board of Supervisors of Fayette County grants permission for the construction of the line over the highways of Fayette County. This permission has already been granted by the Supervisors of Clayton County. The proposed line of this road is from Oelwein to Fayette, and from Oelwein to Arlington and Strawberry Point. The latter place is a point on the Milwaukee Road, in Clayton County.

WINFIELD, KAN.—Plans are being discussed for building an electric railway to connect Winfield, Wellington and Arkansas City. It is said that a proposition has been made by a St. Louis company to build the road if franchises are granted by the towns along the line. J. Mack Love, of Arkansas City, is interested.

MADISONVILLE, KY.—Articles of incorporation have been filed by the Madisonville Traction Company, with headquarters in Louisville, Ky. It is given out that the company plans soon to begin the construction of an electric railway from Madisonville to Nortonville, Ky. The proposed road is to be about 20 miles in length, beginning at Madisonville and passing through Earlington, Barnsley, Morton's Gap, White Plains and Nortonville, all important mining towns of Hopkins County.

FRANKFORT, KY.—The Louisa Railway Company, of Lawrence County, has filed articles of incorporation, capital stock $80,000. The company is incorporated to construct a railroad from Levisa Fork of the Big Sandy River to connect with the Ohio & Big Sandy Railroad. The road is to be built to Stratton Branch and will be 4 miles in length. F. S. McConnell, Mount Vernon, Ohio; M. G. Watson, R. D. Casterline, C. Y. Hays, W. L. Watson, F. J. Dixon and Al Carter, Louisa, and Ashland people, incorporators.

LOUISVILLE, KY.—Plans for a company now being organized in Bowling Green, in which Louisville capital is interested, to build a trolley railway from that city to Louisville, are in an advanced state and the road is a certainty, says the Courier-Journal. Construction work will begin in the fall and the work pushed rapidly to completion. This line will be absorbed by the Kentucky Traction Company, and will form one of the links in the chain from this city to Nashville, Tenn. While the work on the Bowling Green end is being constructed the Kentucky Traction Company will be working at this end of the line, and the two ends will meet to complete the line.

LOUISVILLE, KY.—The Louisville & Southern Indiana Traction Company, organized as successor of the Southern Interurban Railway Company by the United Gas & Electric Company, has elected officers as follows: Samuel Insull, of Chicago, president; R. W. Waite, of New Albany, vice-president and treasurer; J. O. English, of New Albany, secretary. Unofficially it is said that the company will build an electric railway from New Albany to Paoli, French Lick and West Baden Springs, traversing the counties of Floyd, Washington, Harrison and Orange, next year, and within twelve months it is believed that the line to Corydon, Wyandotte Cave and Leavenworth, with its branches, will be in operation.

LOUISVILLE, KY.—The Louisville Railway Company will soon begin the erection of a power house at Meadow Brook Station, on the Third Avenue Jacob Park car line. It will be a brick structure, two stories in height, and will cost about $26,000.

ALGIERS, LA.—Martin Behrman, of Algiers, has presented a petition to the Police Jury of Jefferson Parish asking for rights of way for an electric railway through certain streets in McDonoughville and Gretna.

CAMBRIDGE, MD.—The Eastern Shore Transportation Company contemplates building an electric railway from Cambridge, Md., to Wye Station, on the Queen Anne Railroad. A ferry boat will be run from Cambridge to Cambridge Ferry connecting with the electric railway. The road, which will be 24 miles long, will pass through a thickly settled and prosperous agricultural section of Talbot County. It will connect the towns of Cambridge, Easton, Trappe, Longwood, Skipton and Wye Mills, by way of the Queen Anne Railroad, with the Baltimore & Philadelphia, and enable the farmers to ship their produce to the city markets at a much less expense and in a shorter time than at present.

BOSTON, MASS.—The Blue Hill Street Railway has opened its new line from Mattapan to Blue Hill. Arrangements have been made with the Boston Elevated Railway Company and the Old Colony Street Railway Company whereby the cars of the Blue Hill Company run direct from the elevated station at Dudley Street to the foot of Blue Hill, where connections may be made for Canton and Stoughton. The running time over the new route will be about forty minutes.

FALL RIVER, MASS.—At the annual meeting of the stockholders of the Newport & Fall River Street Railway Company the following directors were elected for the ensuing year: T. F. Sullivan, of Lowell; Angus McLeod, of Newport; Dr. C. A. Brackett, of Newport; George C. Chase, of Middletown; George R. Fearing, Jr., of Boston; Robert S. Goff, of Fall River; H. H. Read, of Fall River. Mr. Read was elected in place of the late Gardiner B. Reynolds, of Newport. It is expected that at the next meeting of the directors matters will be arranged between the road and the city of Newport, and that something will transpire in regard to the road taking over the franchise of the Newport & Providence Street Railway Company. Work on the latter road has been resumed in Middletown and Portsmouth, and it will be pushed toward completion now that the construction men have finished work for the farmers on the island.