

Street Railway Journal

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EDITORIAL NOTICE

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Another Transfer Decision in Chicago

A decision regarding transfers has been rendered by Judge Baker in Chicago, which may prove of considerable importance. The Chicago General Railway Company operates cars over its own lines on Twenty-Second Street, west of the Chicago River, and operates the same cars east of the river on tracks owned by and leased from the Chicago City Railway Company. Transfers issued by the Chicago General Railway Company have never been honored by the Chicago City Railway, although the Chicago General, as a legal move, some time ago issued transfers to Chicago City lines, and announced that it would receive transfers from all intersecting lines. However, as the Chicago City Railway neither issued transfers to nor received them from the Chicago General Railway cars, the practical effect was that passengers could not transfer, and of course received no benefit from the movement. A writ of mandamus was asked to compel these two companies to exchange transfers, and Judge Baker decided that this must be done. In his decision he cites the ordinance by which universal transfers were recently enforced between all the lines of the Union Traction Company. This provides that at any point where any line of any street railway owned, leased or operated by any corporation within the limits of Chicago, crosses or intersects any line of any street railway owned, leased or operated by the same corporation, any pas-

senger who shall have paid his fare on the first mentioned line, shall be entitled to demand or receive a transfer ticket which will entitle him without further charge to be carried on any other line crossing or intersecting it, and owned, leased or operated by such corporation, for a continuous trip any distance within the limits of the city of Chicago. Since the cars of the Chicago General Railway, when operating east of the river, on Twenty-Second Street, use the tracks of the Chicago City Railway, Judge Baker is of the opinion that this ordinance will apply, and that transfers must be issued and received by both companies.

Surface Contact Systems

An interesting report on a year's experience with the Lorain surface contact system at Wolverhampton has been made by the borough electrical and tramway engineer, C. E. C. Shawfield, and in the main it confirms the position of American engineers on this subject. There are so few surface-contact roads in operation that actual results are particularly instructive, and the report in question contains much practical data, although we regret that it deals entirely with the points expressly defined in the contract and not with the technical details of the system or the relative merits as an engineering proposition. However, final acceptance or rejection of the system depends upon its "commercial success" as compared with the overhead trolley system, and for this reason the report of the experience at Wolverhampton cannot fail to be recognized as a valuable contribution. The subject is considered in the report under five separate headings, namely, (1) safety to human beings and animals, (2) reliability, (3) consumption of energy per car mile, (4) cost of wiring, (5) cost of maintenance. The report on the first point may be accepted as favorable to the Lorain system, while no choice is expressed under the second heading, and the advantage is clearly with the overhead trolley in the remaining divisions.

As regards general operative features the Wolverhampton system seems to be fairly successful, and Mr. Shawfield considers it substantially as reliable as a trolley system. If, however, we judge the figures aright this degree of reliability is attained only by very thorough care and considerable expense, for the maintenance of the surface contact system appears to be largely in excess of the maintenance of a trolley system, the exact difference, estimated from the year's experience, being 1.626 cents per car mile. What the probable expense would be after a few years of operation is difficult to say, but experience with tramways systems in general indicates that the maintenance increases considerably as time goes on. In the early days of the trolley the maintenance figures for the first year or so seemed moderate, and could not be assigned their true value until depreciation had settled down to business after the usual fashion.

Another rather startling fact brought out in the comparison is that the energy taken was 0.25-kw-hour per car mile greater on the Lorain system than in case of the ordinary trolley, a difference rather too great to be due to accident. This increased energy represents in the Wolverhampton instance 0.82

cent per car mile increase in the cost of power alone, and, adding to this the extra maintenance charge, the increased expense of the surface contact system amounts to no less than 2.446 cents per car mile, a figure seriously in excess of trolley results. It is somewhat troublesome to estimate the effect of this increase on actual operating expenses, for the maintenance charge depends on both the actual length of track and on the extent to which it is used. On the face of the returns the extra expense on a road operating 100 cars, each making 100 car miles per day, would amount to nearly \$80,000 per year, but the actual figure would probably be somewhat less.

Altogether the report does not sound very encouraging, and it fully bears out the American practice of keeping clear of such systems and going to conduit roads wherever the overhead trolley wire is barred out. A well-installed overhead trolley system, with feeders and all lines for other classes of electric service underground, probably represents the cheapest and most reliable phase of electric railway service. Of course, a certain amount of danger inheres in the overhead wire at 500 volts or more, but it has been conclusively shown by experience that nearly all the practical danger comes from the breaking of other wires than the trolley wire. The records of the surface contact roads in Paris have been distinctly unfavorable, as shocks from studs left alive after the cars have passed have been extremely common, and have killed a number of horses. Those in Wolverhampton are said to have been "harmless," but we very much doubt whether the American public would enjoy the greater chance of these "harmless shocks," which Mr. Shawfield attributes to the surface contact system. The results in cities where there is no great street traffic, as Tours and Monte Carlo, have been much more satisfactory than where there is a large street and car traffic, as in Paris. For this reason there was some hope that the Wolverhampton would be somewhat more successful than it has proved to be. It is a pretty good rule to follow to keep conductors out of reach of man and beast, even when charged at only a low voltage.

Dangers From Defective Car Wiring

Much attention has been given of late to consideration of the subject of securing better wiring and the proper protection of the underbody of electric cars, and the prospect for a much better condition is very promising as a result of the investigations now being made. However, much remains to be done. Since December last five car house fires have occurred in Michigan alone, all of which have been reported as having originated from electrical causes, and these examples have called forth numerous suggestions from Underwriters in all sections of the country. It is known to railroad men and engineers that much of the car wiring is seriously defective, that the resistance is dangerously located in many cases, and that an examination will show many cars with the underside of the floors and sills badly charred. Car heaters are often carried in wood boxes and separated from their casings by thin asbestos paper only, which is depended on to insulate them from the heat, and in many instances even this protection has been found torn off and the heater coils surrounded by dust, paper and floor sweepings, a condition that is likely to cause a blaze any minute.

When seats run the full length of the car an almost indescribable collection of rubbish will often be found, such as paper, peanut shells, transfers and the like, banked in around the heaters and with no protection from cigarette or cigar butts

being deposited there, too. In this connection it might be well to call attention to the recommendation of the Underwriters that window ledge openings should be protected by shields.

It is interesting to note that manufacturing companies have taken up the subject of car wiring, and that the problem is now receiving earnest and intelligent study. Many plans have been suggested for meeting the situation, and some of them may be enumerated here with profit to those engaged in ordering equipments as well as those building cars. It is recommended, for instance, that the complete underside of the car floor sills and cross-framing be faced with a non-inflammable material, such as "Transite," which is a compressed asbestos board, $\frac{1}{4}$ in. thick, and will stand an enormous amount of heat, at the same time being almost as stiff as slate. This covering should be painted and screwed to the underbody of the car, and over the motors additional protection afforded by a layer of No. 8 steel. This will protect the underbody from over-heated resistance and any arc caused by motor leads or wiring.

In the elevated types of multiple control and for interurban trains it is recommended that cables be carried from the control devices through iron pipes, and the ends of the pipe sealed to prevent admission of moisture; the main power wires cleated to the fireproofing with corrugated ducts made of horn fiber or other proper insulating material, treated so as to be made waterproof, and lined steel conduit properly bushed and sealed has been suggested for this work.

Lighting and heater circuits have been installed in flexible metallic conduit and flexible metallic armored conductors, and both have been very satisfactory. Particular attention should be given to provisions for having all conduit terminate in properly designed junction and branch boxes and the circuits controlled by quick-break switches and protected by cartridge fuses contained in a slate-lined iron box. All joints in the conduit and connections to the several boxes should be securely clamped and every precaution taken to prevent injury from vibration or mechanical weakness.

We think this subject of great importance and cannot too heartily commend the activity of some of the manufacturers who are not only adopting such methods as here suggested but are endeavoring to improve upon them.

Excessive Awards in Accident Suits

We have frequently referred to the enormous sums paid out by railway companies for personal injuries, and to the fact that this obligation constitutes one of the most serious hazards which street railway companies have to face. Railway companies are exercising more rigorous care in the selection and training of employees than ever before. But although the courts hold them responsible only where the accident is attributable to the negligence of their employees, the operation of large transportation systems is dependent on so many human agents that accidents will occur under the best management. We do not claim that in cases of this kind damages should not be paid by the railways to the injured person, but from the standpoint of equity we do believe the companies are being held responsible for far more than their share of the damage.

Two cases, which have recently occurred in New York, are instances of what we have in mind. The Appellate Division of the Supreme Court of New York recently affirmed a judgment of \$100,000 damages against the New York Central Railroad for the death of a victim of the tunnel accident on Jan. 8, 1902. This high death claim was justified by the fact that the victim was a superintendent of one of the large department stores in New York and earned about \$30,000 a year. The other case

was an award of \$50,000 damages against a street railway company for an accident in which the victim, a musician, had her thumb crushed between the doors of a street car in New York. The plaintiff claimed that she had spent a large amount of time and money in learning to play the harp, and was in receipt of a large income as a harpist, but the accident would prevent her entirely from exercising this talent and knowledge.

Every injury received in a railway accident is, of course, extremely unfortunate, but it is equally true that it is impossible entirely to recompense the sufferer for it by a money payment. There are very few men who would be willing to sacrifice a leg for the damages they would receive from the railway company, whether it were \$2,000 or \$10,000, or would be killed for the pleasure of knowing that their estate would secure as a result even \$100,000 from the railway company. It being, therefore, impossible to remunerate entirely the victim of any injury of this kind, there is in one sense just as much reason for paying a small sum for an accident of this kind as a large sum. The defenders of the present law, in answer to this, declare that while pain and anguish cannot be paid for, the injured person is at least entitled to the money loss which is occasioned by the accident. We believe, however, that even this cannot be measured. The person injured in a railway accident might have been the victim of another accident the following day, for which nobody else or even himself was responsible.

A reduction of the excessive amounts now paid, under direction of the courts, can be justified in two ways. The first is that persons whose lives or limbs are worth more than a certain amount to themselves or to their estates assume part of the risk of any resulting accident when they patronize transportation companies. A person, for example, who invests \$50,000 or \$75,000 in a thumb should be regarded as in a sense embarking in an "extra hazardous" business, and the railway company should not be obliged to pay more for that thumb in case of an accident than if it were the thumb of a laboring man. To cite a parallel case, suppose a man should carry a \$20,000 peachblow vase into a street car under his arm, and then claim the full value of the vase in case it was broken in a collision. Persons who do not wish to take these hazards should ride in other means of conveyance or should secure outside insurance. At all events, the railway company should not be obliged to stand the entire loss.

Another ground on which the payment of lower damages can be justified is one which we have mentioned before, but which is perfectly sound. That is that the extra risks to which persons are liable from modern methods of railway operation form one of the penalties which they and the community in general pay for the transportation facilities which they enjoy. The same immunity of pedestrians from danger of being run over cannot be expected on Broadway as in the Maine woods; and, in the same way, if people will insist upon riding at 60 miles an hour they cannot hope to enjoy the same freedom from accident as they do in China in a car drawn by man-power at 4 miles or 6 miles an hour. An error in judgment, which, in the former case, might result in a catastrophe, would in the latter involve only a slight inconvenience or delay. City life, therefore, involves a risk which those who enjoy the benefits of high-speed transportation and the other advantages which are associated with a highly-developed civilization, ought to assume, in part at least. In other words, they accept the penalties of an extra hazardous life by living in a city or riding at high speeds, and should not seek to avoid the accompanying obligations, one of which is that of assuming part of the risk which this life involves.

Responsibility for Injuries Inflicted by Strikers

In a recent decision the Supreme Court of Minnesota made a very just disposition of a case involving liability of a street railroad for the safety of passengers in time of strike. The decision was rendered unanimously after unusually careful consideration, so that the case will have considerable influence on courts outside of Minnesota. It ought to be accepted as a precedent because it followed common sense as well as justice.

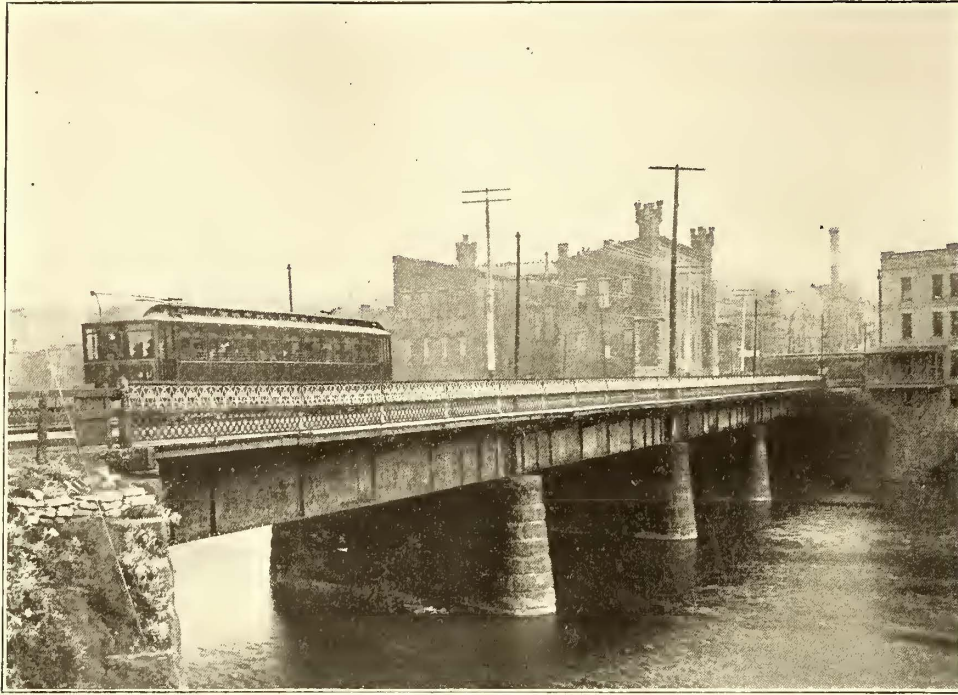
The action was directed against Luther Mendenhall, as receiver of the Duluth-Superior Traction Company, and was the outcome of a general strike, which was bitterly contested, and resulted in much violence on the part of the lawless element among the strikers and their sympathizers. The plaintiff was a passenger on one of the cars at this time, and was injured by being struck upon the head by a stone thrown from the street into the car by a strike sympathizer, who was, of course, in no way under the control or direction of the defendant, and who later left town when he heard of the results of his conduct. The case was tried three times in the District Court. The juries disagreed the first two trials, and on the third gave a verdict of \$4,400 to the plaintiff, Fewings. The case was appealed to the Supreme Court, and a new trial was ordered, in which Fewings received a verdict of \$10,000. Another appeal was taken and the verdict for the defendant was reached. The Court held that defendant was not guilty of negligence in attempting to operate cars during the strike; and that the evidence was insufficient to justify a finding of actionable negligence against defendant as respects the act resulting in plaintiff's injury.

The law holds a street car company to the highest degree of care and foresight with regard to the machinery of the road, cars, etc., and also in protecting passengers from employees or other passengers or persons who may have been received upon a car. The question was whether the same responsibility would be fastened upon the road in respect of protection from a mob in the streets. It was laid down that so far as such outsiders were concerned the carrier was liable only to exercise reasonable care. The claim was made that either the blinds of the car should have been pulled down or a heavy canvas stretched outside of the car to protect passengers. The Court answers this by saying that such precautions would have tended only to provoke greater violence on the part of the strikers. "They would naturally have assumed, on seeing a car pass in that condition, that either the officials of the road or non-union or scab employees were aboard, and it would have incited the lawless element to greater efforts to prevent the operation of the cars." To the further suggestion that the proprietor of the car line was in duty bound to notify plaintiff of the violent conduct of the strikers and their sympathizers, the very obvious reply is made that the passenger knew just as much about the condition of affairs as the officers of the company themselves.

The result is that persons becoming passengers during a strike to a large extent assume the risk of injury. Practically this is not unfair. It is sometimes essential for companies, in order to avoid questions of forfeiture of franchise, to see that cars are actually run, although strikers are present in force and very turbulent. Even if cars are run principally for moral effect the company should not be mulcted by passengers who go into danger with their eyes open. Of course, a different question would arise if a passenger had no reason to apprehend peril, and was allowed to expose himself to it when he might have been warned in advance.

THE APPELYARD SYNDICATE'S INTERURBAN SYSTEM—I

In the Central West the building of long-distance electric roads by several syndicates is taken as an indication of a fixed policy to develop a system that will ultimately prove a factor in the handling of freight as well as passenger traffic. At present it is possible for passengers and freight to be trans-



SCIOTO BRIDGE IN COLUMBUS, C., L. & S

ported from 100 miles to 200 miles by electricity. The building of long-distance roads has been particularly marked in Ohio, and a very large proportion of the mileage in that State may be credited to the group of capitalists commonly known as the Appleyard syndicate. In a general way it may be said that this syndicate aims to operate through electric trunk lines connecting Cincinnati, Toledo, Columbus, Cleveland, Wheeling, W. Va., and ultimately Pittsburg, Pa. Reference to the map on the opposite page indicates that this syndicate, in connection with closely allied interests, already has in operation lines covering more than two-thirds the mileage required to consummate these plans, and rapid progress is being made with the uncompleted portions.

The syndicate headed by Arthur E. Appleyard, of Boston, is composed of Boston and Ohio capitalists, and for the last three years it has been engaged in building lines radiating from Columbus, Springfield and Dayton, Ohio. The roads built and controlled by the interests represented by Mr. Appleyard are enumerated below: The first to be constructed was the Dayton, Springfield & Urbana Railway, built in 1899, between the cities mentioned in the title. This is now one of the most prosperous lines in Ohio. In 1902 the Columbus, London & Springfield Railway was built between Columbus and Springfield. To afford entrance for this line the syndicate built a standard gauge city system in Columbus, known as the Central Market Street Railway, together with an interurban loop affording terminal facilities for all the interurban lines building into the capital city. The Columbus, Grove City & Southwestern Railway, an old line, was purchased and rebuilt, and is now being extended to Washington Court House. A spur line was built from Medway on the Dayton, Springfield & Urbana to New Carlisle, and this is now being extended to Troy. A company known as the Urbana, Bellefontaine & Northern has been organized and is building a northerly extension of the Dayton, Springfield & Urbana Railway, to be operated as a part of the latter. The

Kenton & Southern Railway Company has been organized to build between Bellefontaine and Kenton, and eventually this will be extended to Findlay, to connect with a line to Toledo. Last year the syndicate purchased the Dayton, Lebanon & Cincinnati Railway, a steam road operating from Dayton to Lebanon, and this is to be equipped for electric operation of passenger cars. The Ohio River & Western Railway, a narrow-gauge steam line operating between Zanesville and Wheeling, has recently been acquired, and will be equipped for electric passenger cars. As outlined the system includes about 150 miles of electric lines in operation, 138 miles of steam roads to be changed to electricity, and about 70 miles of electric roads under construction, with about the same mileage contemplated for the near future. In addition to these roads the Great Northern Construction Company, at the head of which is A. E. Appleyard, has constructed the Columbus, Buckeye Lake & Newark Traction system, and is now building the Columbus, Newark & Zanesville Railway. The two roads last mentioned are controlled by Tucker, Anthony & Company, of Boston, and are very closely allied. Tucker, Anthony & Company also own the Canton-Akron Railway operating between Akron, Canton and Massillon, and they are building the Canton & New Philadelphia Rail-



OVERHEAD WORK AT DOUBLE-TRACK CURVE, C., L. & S.

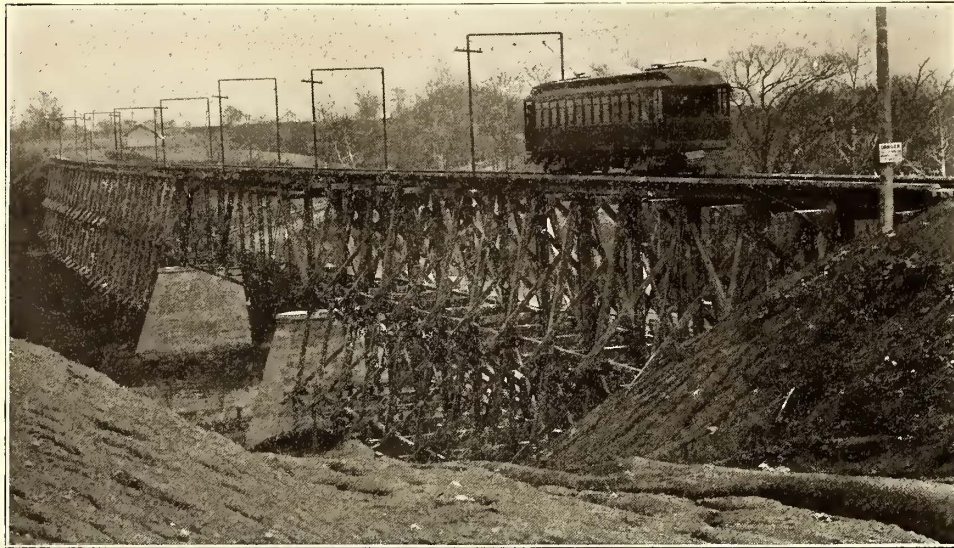
way to New Philadelphia. Plans are also under way for building a line from New Philadelphia to Zanesville, and when this is completed there will be an unbroken electric line from Cleveland to Cincinnati.

COLUMBUS, LONDON & SPRINGFIELD RAILWAY

The Columbus, London & Springfield Railway is equipped and built for high-speed operation. At present cars operate by way of London, but a cut-off is being constructed between Summerford and Lafayette which will reduce the mileage between terminals from 49 miles to 45 miles, making the road practically an air line. Over the entire distance it parallels the

National Pike, an old government road, and between West Jefferson and Columbus the road traverses the side of the highway under a twenty-five-year franchise. This amounts practically to a private right of way, since the highway is nearly 100

span 162 ft. long, 65 ft. above water, and resting on concrete abutments. The balance of the structure is three-deck timber work. Two steam roads are crossed by overgrade crossings, while others are crossed at grade with Porter derailleurs for protection. The roadbed is graded 16 ft.



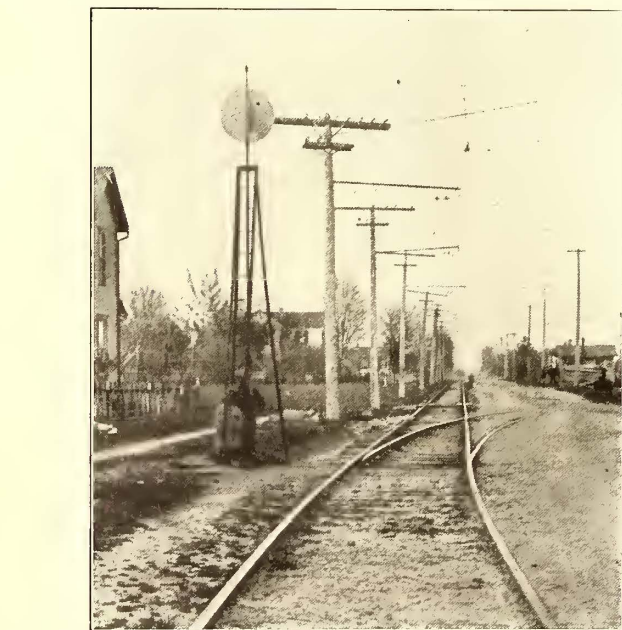
BIG DARBY BRIDGE, C. L. & S.

ft. wide and the track is separated from the wagon road by ditch and pole line; if desired, the company may fence its track under the franchise. The balance of the road is on private right of way ranging from 50 ft. to 100 ft. in width. A unique feature of this road is that in the majority of cases it passes around the outskirts of the small villages, avoiding the main street, to insure safety and admit of continuous high speed. All of the curves caused by these swing-outs have been double tracked so as to serve as passing points.

The country traversed is extremely level, and there are no grades over 1½ per cent. It is purposed to follow this standard throughout the entire system, and it has been necessary to make

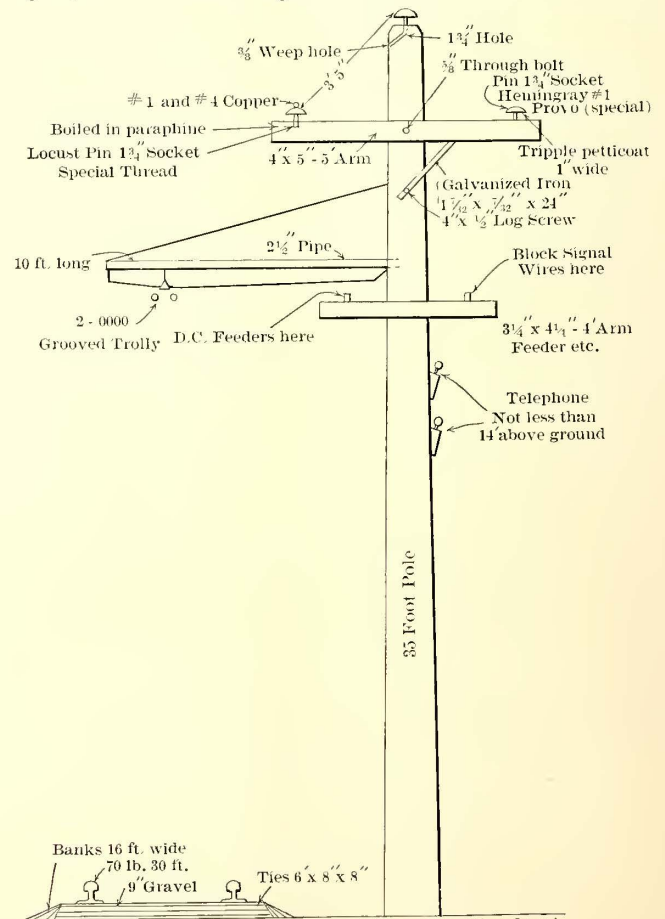
switches are laid with No. 10 frogs, and have 73-ft. leaders. Ramapoo 14-ft. targets are used at all turnouts. These are turned by hand, and have a spring so that cars can run through at high speed. At each target there is a circuit of five incan-

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HIGH STAND TARGET SWITCHES ON D., S. & W. AND C. L. & S.

several large cuts and fills because of this policy. Markley Hill cut is 43 ft. deep in one place, with a 29-ft. fill nearby. About 90,000 yds. of earth were taken out the cut, just making up for the fill. The Foster cut and fill required about the same amount of labor, but the cut is not so deep nor the fill so high. Crossing Big Darby River the company erected the structures shown herewith. The bridge is 950 ft. over all, having one steel



OVERHEAD CONSTRUCTION AND ROADBED

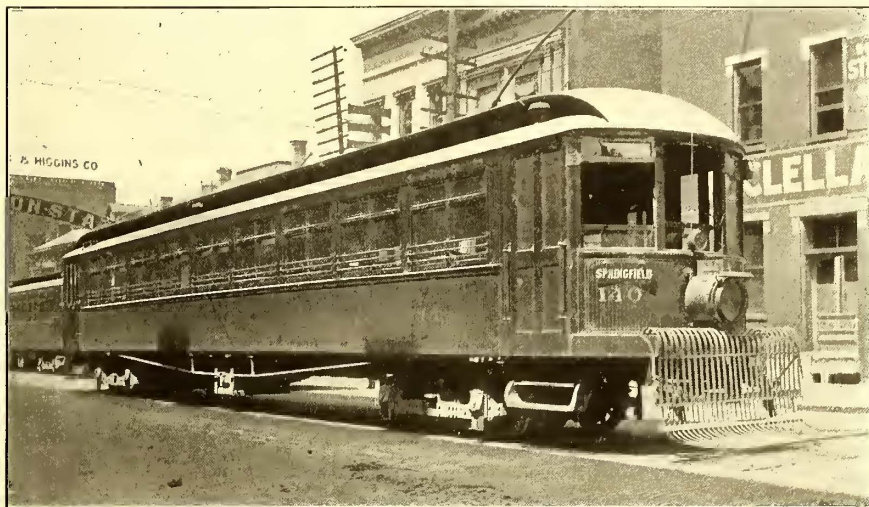
descent lamps, including two colored lamps on the target, two at the lock and one on the telephone box, which is located between the tracks. At all railway crossings there are also five lights, a white light on the crossings, red lights at the derailleurs, notifying the motorman to stop, and green lights 150 ft. from the crossing notifying him to get the car under control. Green posts are daylight signals for crossings and switches, and white

posts are stopping points for local cars. There are also "slow" signals at curves and "W" for whistle at street crossings. All road crossings are protected by cattle guards, and the track is fenced on both sides with American Steel & Wire fence. Connection is made with all steam roads.

The details of the standard overhead construction are shown herewith. Trolley wire is 0000 grooved, and it is tapped to the direct-connected feeders every tenth pole. Poles are 35 ft. tall, and in some places 40-ft. and 45-ft. poles have been used to clear trees for the high-tension wires. Poles are octagon shape and painted red. Brackets are of the Craig-head 10-ft. flexible type. No. 1 copper is used for high-tension transmission, and the details of this construction are as indicated. The high-tension lines pass around all towns on separate poles and make a circuitous route in entering Columbus. In crossing steam roads the high-tension lines clear the tracks 25 ft.

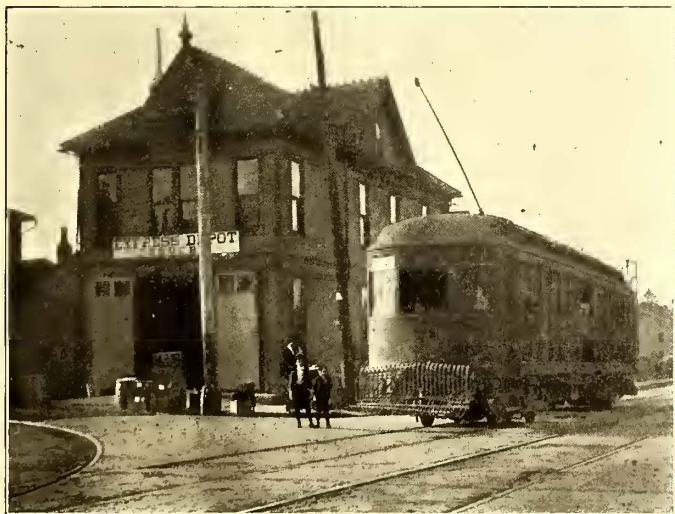
The car equipment of the Columbus, London & Springfield is among the heaviest ever built for electric service in this country. Those used in regular service at the present time are four in number, and are 62 ft. over all. They have baggage compartment, smoker and passenger compartment. There are seats for sixty-four passengers, but the cars have carried as many as 180 people. The baggage compartments are of great advantage for carrying travelers' sample trunks, and much business is obtained from this class of people, whereas many other roads cannot accommodate them. A toilet room and water-cooler are located between the two compartments. The interior finish is in solid mahogany, of rich dark colors, inlaid with holly. The seats in the passenger compartment are red plush, and rattan in the smoker. The General Electric type-M control is used, and the power equipment consists of four Gen-

Columbus and Dayton the company has two 60-ft. parlor cars and five more will soon be delivered. An interior view of one of the cars is presented. They have individual plush chairs, two toilet rooms, observation ends and are magnificently finished inside. These cars have extra heavy B. & S. trucks, and are



60-FT. COLUMBUS, LONDON & SPRINGFIELD CAR

equipped with four 125-hp General Electric motors. They are geared to 65 miles an hour, and will make the run from Columbus to Dayton, 77 miles, in 2 hours and 30 minutes, and will operate under two hours' headway. They will have right of way over regular cars and will stop only in Springfield. The cars were all built by the Barney & Smith Car Company,



FREIGHT STATION AT JUNCTION OF C., L. & S. AND D., S. & U. SPRINGFIELD



INTERIOR PARLOR CAR, C., L. & S.

eral Electric No. 73 motors. These are mounted on Barney & Smith type-J trucks. Wagenhals are headlights, Ham trolley catchers, Kalamazoo trolley wheels, Christensen air brakes and Consolidated heaters are included in the equipment. The cars weigh complete 75,000 lbs. On a recent special run one of them made 42 miles in 1 hour, 7 miles in 8 minutes and 1 mile in 57 seconds. There are also four cars having the same general details, except that they are 50 ft. over all and have no baggage compartments. There are also four 60-ft. express cars equipped with four General Electric No. 57 motors, B. & S. type-F trucks with 6-in. axles. For fast limited service between

Dayton. It will be noticed that the trucks are designed for third-rail shoes, as it was the original intention to equip with this system, and the plan may be carried out eventually. It is believed that sleeping car service between Columbus and Cincinnati might prove a profitable innovation, and the company will make the experiment. An order has been placed with the Holland Sleeping Car Company for a sleeper which will accommodate thirty people. For hauling freight and construction cars the company has ordered two 60-ton Baltimore & Ohio type electric locomotives. These will be equipped with four 125-hp motors, and will be designed to haul fifteen freight

cars. In addition to the equipment mentioned the Columbus, London & Springfield has snow-plows and line cars, besides two 62-ft. Jewett semi-convertible excursion cars.

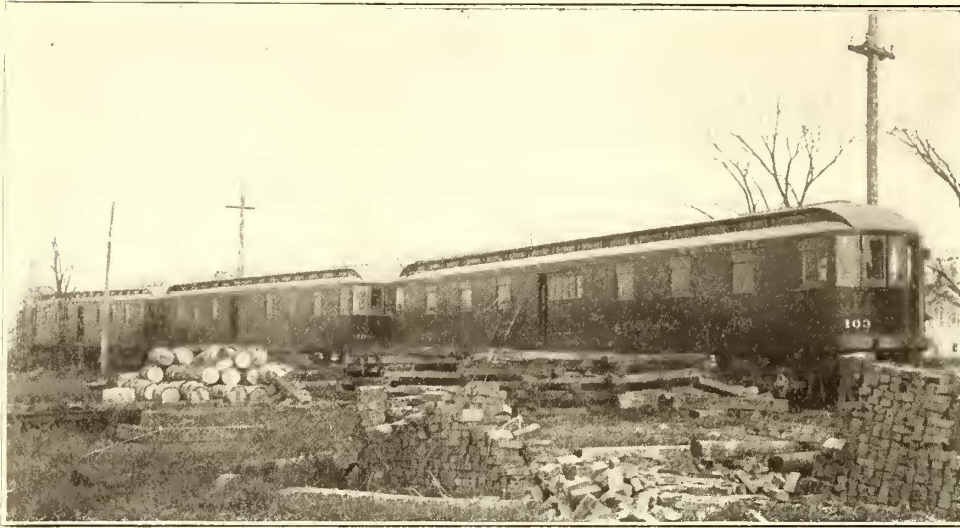
The tributary population included in the cities and townships

up inside the box, which can be opened only by the superintendent. On the line the motorman calls only when ordered to do so, or when cars are more than 5 minutes late. The motorman takes the order, repeats it to the conductor, who in turn repeats it back to the despatcher, and the latter says "complete." No written order is used, which saves time. When the line is knocked out the cars make regular meeting points, and extras wait the arrival of regulars and run on their time. In addition to this the United States Electric Signal Company's system is being installed over the entire system. The telephone instruments were furnished by the Hipwell Manufacturing Company.

At Springfield the Dayton, Springfield & Urbana has a unique traffic arrangement with the Erie Railway. The main line of this system passes through Durbin, 7 miles from Springfield, and the electric company operates a special car known as the "Erie Transfer," which connects with all passenger trains on the steam road.

Regular passengers are not carried, and Erie tickets sold in Springfield bear a coupon for the electric car. The electric road receives a pro rata of the total amount collected, except in case of tickets for distant points, when it receives a flat rate. The arrangements also provide that the electric line is to haul steam excursion trains to the center of the city by means of electric locomotives.

The population in townships traversed by the Dayton,



NEW FREIGHT AND EXPRESS CARS

traversed by the Columbus, London & Springfield is 179,207. The towns touched with rates of fares and population are detailed below:

	Population	Single Fare	Round Trip	Distance Miles
Columbus	125,560
West Jefferson	803	\$0.25	\$0.45	16
Lafayette	200	.35	.65	23
London	3,511	.45	.75	27.6
Summerford	200	.55	1.05	31
Lagonda	300	.60	1.10	35
Harmony	100	.65	1.15	45
Springfield	38,253	.75	1.35	48.8

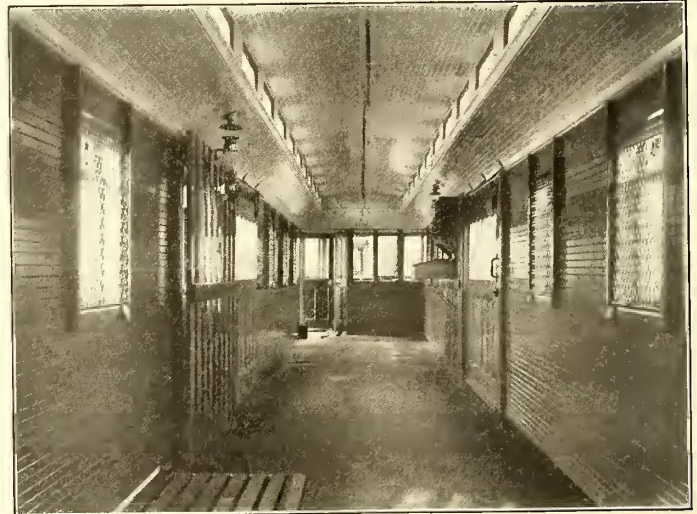
DAYTON, SPRINGFIELD & URBANA

The Dayton, Springfield & Urbana Railway was described in the STREET RAILWAY JOURNAL of April 17, 1900, but immense improvements have been made since that date, while others are under way. The road is now on entirely private right of way from 50 ft. to 100 ft. wide. As the traffic is the heaviest on this portion of the system the entire road is being double tracked. The route has been changed at several points to avoid heavy grades, and in entering Springfield a new right of way has been secured through Snyder Park. A large double-track trestle is being built near Dayton, crossing the Cincinnati, Hamilton & Dayton tracks and Harshman's Creek.

It will be 302 ft. over all, a portion 72-ft. plate girders, and the balance 30-ft. plate girders. These will be supported on steel posts, 15 ins. x 15 ins., resting on concrete abutments. Tracks will be on 13-ft. centers. Near this bridge there is a 65-ft. cut, where 112,000 yards were removed and filled nearby. Because of the fact that the power house on this road will supply the greater portion of the system, the high-tension wires are on independent poles, and they will be made in duplicate on separate poles.

The Dayton, Springfield & Urbana has ten 50-ft. passenger coaches and two 60-ft. express cars equipped similarly to the Columbus, London & Springfield cars.

An interesting system of despatching is in vogue on the Dayton, Springfield & Urbana, and will probably be adopted on the other lines. Written orders are given only from the despatcher's station at Medway. The order is written on an automatic register, made by the Egrey Autoregister Company, of Dayton. This makes two copies, one of which is torn off and handed to motorman and conductor, who read it and then hang it on a hook in the office, while the other copy is rolled



INTERIOR EXPRESS CAR

Springfield & Urbana is 146,267. The towns included, with rates of fare, are indicated:

	Population	Single Fare	Round Trip	Distance Miles
Dayton	85,833
Harshman	300	\$0.10	\$0.15	5
Fairfield	335	.20	.35	8
Osborn	948	.20	.35	10
Medway	200	.25	.40	15
Donelville	200	.30	.55	18
Enon	295	.30	.55	20
Snyderville	100	.40	.75	24
Springfield	38,253	.40	.75	27
Glen Echo	100	.55	1.05	35
Bowlusville	100	.60	1.10	37
Urbana	6,808	.65	1.15	42

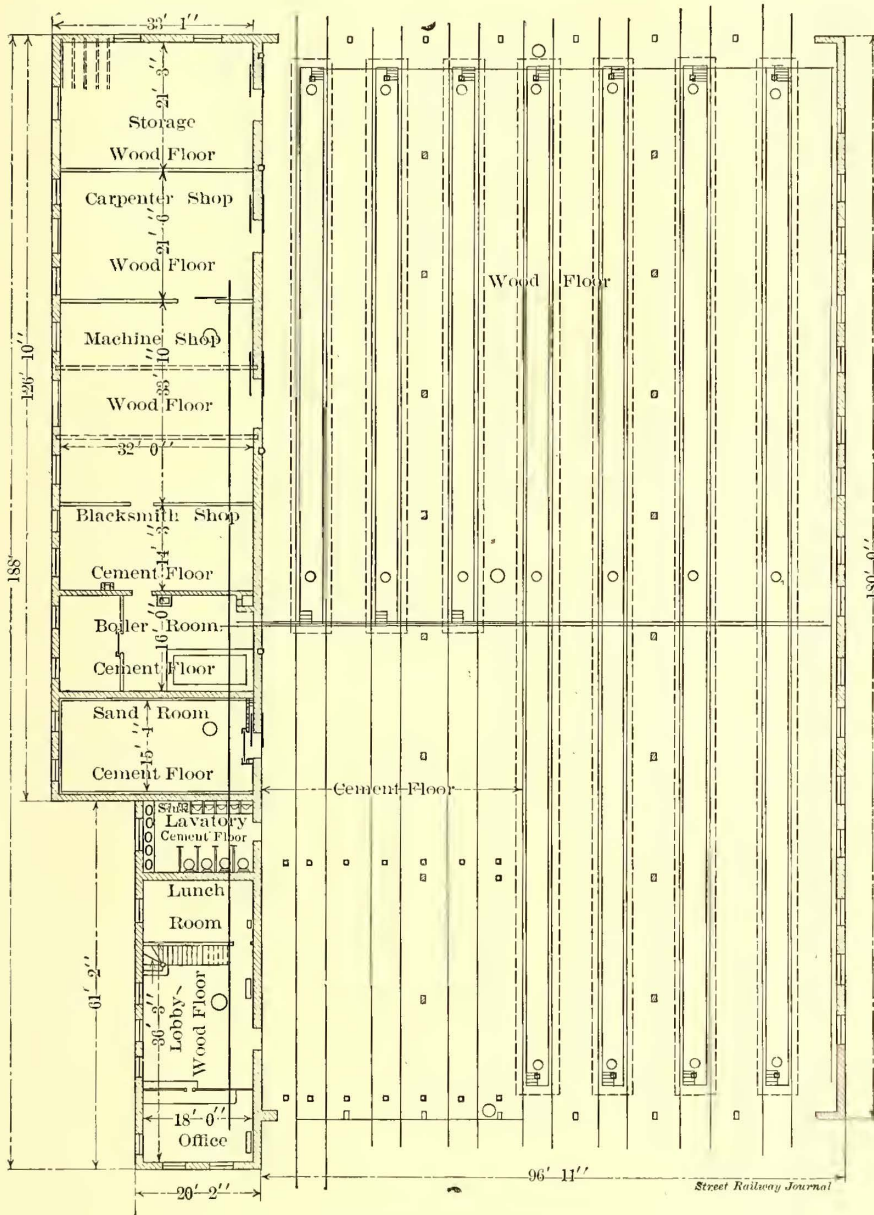
CENTRAL MARKET STREET RAILWAY

In building into Columbus the Appleyard syndicate decided to build its own city system to provide entrance for interurban lines. The Central Market Street Railway Company was formed for this purpose, and it acquired franchises for about 30 miles of road. The chief lines operate through the city from north to south and from east and west, all cars traversing the interurban loop in the center of the city. The loop itself is

jointed are bonded with 0000 General Electric figure 8 bonds, and cross-bonded every 500 ft. with 0000 Roebbling wire. The overhead construction is supported on 30-ft. iron poles, with the exception of street corners, which are 32-ft. Trolley wire is 0000 Roebbling, and all span wire is insulated in four places. Two of the insulators carry the interurban telephone wires.

The Central Market rolling stock is unusually fine. There are twenty-five 40-ft. double-truck cars, finished in mahogany both inside and outside. One of them is illustrated. Fifteen of these cars were built by the Laconia Car Company, and ten by the Jewett Car Company. The interior finish is inlaid, they have plush side and cross seats, push buttons and double windows. Five of them have smoking compartments, and these are at present used on the Columbus, Grove City & Southwestern line. The cars are heated by Consolidated electric heaters, and have the Christensen air-brake outfit, with four General Electric No. 57 motors. A portion of them have Laconia trucks, and the balance are of the Peckham type. There are two thirteen-bench Laconia and ten nine-bench Jewett cars for summer traffic, also ten single-truck closed cars; these will be used on the city systems in smaller cities where local service is required. The company has under contract thirty-two fifteen-bench open cars. Central Market cars operate under 7-minute to 10-minute headway, and traverse the most thickly populated portions of the city besides drawing trade from a large number of outlying factories, among them the United States Steel Corporation plant at Steelton, which employs 6000 men to 8000 men. Under the terms of its franchise the company sells eight tickets for 25 cents, with 5-cent single fares. It gives transfers to cars of its own system but not to the interurban cars.

On West Mound Street the company has a site of 4½ acres, where it is completing a car house and repair shops. These will also be used for some of the cars of the Columbus, London & Springfield and Columbus, Grove City & Southwestern, and the lighter repair work for these interurbans will be done here. The building is 188 ft. 4 ins. long, and 97 ft. wide at the widest part. The car house proper is 72 ft. wide, and has the saw-tooth type of roof construction. There are three tracks on a level, half the space being provided with



CAR HOUSES AND SHOPS

owned by the Columbus, London & Springfield Company, but the balance of the system is owned by the Central Market Company. The city lines are all double track, and a noteworthy feature is that in order to provide large radius curves for the long interurban cars, the company was obliged to purchase corner lots in all cases, and in a number of instances houses were torn down. The smallest curve on the system has a 60-ft. radius and the largest 114 ft. On the 6½ miles of improved streets traversed by the system standard Trilby rails, 107 lbs. to the yard, 62 ft. long and 9 ins. high, are used, and these are set on 6-in. ties with a 10-in. bed of crushed stone and concrete, making a roadbed which, it is claimed, will last for many years. The section between Long Street on Third Street to Warren Street, extending through Chestnut Street to Fourth Street, has three rails, because the Columbus Railway Company's gage is 5 ft. 2 ins. This feature was illustrated in the article on the Columbus, Delaware & Marion Railway, published in the March 21 issue of the STREET RAILWAY JOURNAL. All rail

pits for repair work, and the balance cemented floors for washing, while the other four tracks have slanting ends for car storage. There is storage space for twelve of the largest interurban cars. There are seven doors at each end of the Kinnear rolling type. The wing, which is 27 ft. wide and two stories high in front, is divided into offices, sand-house, blacksmith shop, boiler room, machine shop, carpenter shop, armature and stock room. The plan of the building is presented herewith. The special work will include three tracks to the west and four to the east. The machine shop will be provided with a shaper, two lathes, drill press, grinder, wheel lathe, wheel press and lathes for armature winding. The carpenter shop will have a buzz-saw, band-saw and circular-saw and other tools. The pits will be provided with hydraulic jacks of a special design, furnished by Watson & Stillman Company. Cars are scrubbed out daily, and a force of women is kept busy at this work at all times. Seats are cleaned by air furnished by the compressor on the car. The purchasing agent of the system will occupy hand-

somely appointed offices in the front of the second floor, and there is a lounging room in the rear for employees.

INTERURBAN STATION

The interurban union station at Columbus, located on the loop on Gay Street, near High Street, is owned and operated by



INTERURBAN LOOP IN COLUMBUS

the Columbus, London & Springfield Company. It is a large brick dwelling house remodeled for the service, and while it is well equipped it has been found wholly inadequate for handling both passenger and freight service as originally proposed, and plans are being made for two new stations to be located on the loop; one will be for passenger and the other for freight and express. It is claimed the passenger station will be one of the finest of its kind in the country. As in the case of the present station it will be owned by the Columbus, London & Springfield Company, and each interurban line traversing the loop will pay its proportion of the expenses. A site has already been secured for the union freight station, and it is announced that it will be ample in size to handle the business of the present roads as well as those building and contemplated.

EXPRESS BUSINESS

At the present time both the Columbus, London & Springfield and the Dayton, Springfield & Urbana are doing an extensive express business, but it has not been pushed on either of the properties. At the present time about 10 per cent of the receipts of the Dayton, Springfield & Urbana come from this source, but it is believed that with systematic efforts the business can be made to equal if not exceed the passenger traffic. It is proposed to have cars make two round trips a day from Columbus to Dayton, while the spur lines will have one round trip a day. The business is at present divided into two classes. The regular express includes collection and delivery in all towns of over 4000 population, and is about the same as regular steam express rates. The non-delivered class is a trifle higher than regular freight rates. The company has express offices in connection with its ticket offices in all the principal towns, and it maintains horses and wagons in towns of over 4000.

PARKS

At present the chief pleasure resort of the system is Tecumseh Park. Historians say that within the confines of this park the famous Indian warrior, Chief Tecumseh, made his last stand and met his fate. The site includes 100 acres, and is within a short distance of the power house at Medway. A dam in Mad River affords a fine pond where there is boating, bathing

and fishing. The company has erected a large dance hall and pavilion, which is leased on a percentage basis, as are the majority of the other attractions, which include a Ferris wheel, bowling alley, shooting gallery and miniature railroad. The pavilion is 100 ft. x 50 ft., and has a 10-ft. promenade all the way around. The building may be closed in winter and is heated by a number of Consolidated electric heaters. Admission to the grounds is free, and Sundays and evenings the company makes a round-trip rate of 25 cents from either Springfield or Dayton. At other times the round-trip rate is 40 cents from Dayton and 35 cents from Springfield. The pavilion is rented to private parties much of the time, and private cars are supplied from either Dayton or Springfield for \$12.50. This, of course, does not include the use of the pavilion.

The Columbus, London & Springfield is planning to establish a private park near Columbus. It will include about 100 acres and have a fine pond. At this park will be erected a merchants' club house. An effort will be made to secure a club membership of 1000, at annual dues of \$5 per year each, the park to be open only to members and their families and guests.

DEVELOPMENT PLANS

The plans for developing the recently acquired steam roads contemplate much more radical innovations than any heretofore attempted. The Ohio River & Western Railway traverses some of the most important coal fields in Ohio, and the company itself owns an inexhaustible field. It is the intention, as soon as possible, to change the road to standard gage and equip it with electricity. In the heart of the coal fields it is proposed to erect the largest interurban power station in the world. It will be situated near the mouth of a coal mine, from which fuel will be mined and passed to the boiler room of the station. A well watered site has been secured for such a station. The power units will be turbines, and the transmission lines will be built with the view of handling 60,000 volts. The Ohio River & Western is to be equipped with the latest rolling stock for handling coal, and it is the intention to develop the coal fields in this territory, something which has never been possible heretofore, owing to the narrow gage and inferior equipment of the road.



UNION DEPOT AT COLUMBUS

There are also valuable sandstone quarries and oil fields along this road, and it will be the policy of the owners to make use of all these advantages. As a connecting link between Cincinnati and Pittsburg it is believed the road will develop a heavy passenger business as well.

The Dayton, Lebanon & Cincinnati road traverses a rich farming country, and when connection is completed with Cincinnati the road will furnish one of the best outlets for the business of that city.

At Beavertown and Centerville the company owns very extensive limestone quarries which have been worked for years. Great quantities of stone are shipped to Cincinnati, Hamilton, Dayton and other points. The company also owns a large rock

crushing outfit, and sells large quantities of crushed stone besides using it for ballast. For handling this material the company has purchased twenty steel hopper-bottom gondolas of the largest size.

The Dayton, London & Columbus has recently secured a private right of way from the heart of Dayton to its line at Hempstead, a distance of 7 miles. Adjoining the Union passenger station at Dayton the company has acquired 45 acres where a terminal freight station and yards will be erected. The Dayton, Springfield & Urbana line will join the Dayton, London & Columbus at this point. For rapid handling through freight a cut-off is being built from Harshman's on the Dayton, Springfield & Urbana to Lebanon Junction on the Dayton, Lebanon & Cincinnati, thus enabling freight to be transported around Dayton. The Dayton, Lebanon & Cincinnati has ninety-seven freight cars of all kinds and seven steam locomotives, which will be retained for hauling freight trains. The line will be equipped with electricity at once for the passenger service.

MANAGEMENT

Each of the Appleyard properties has its own set of officers and the roads are handled separately. In the case of the Dayton, Springfield & Urbana, Columbus, London & Springfield, and Central Market Street systems the chief executives are identical, John S. Harshman, of Springfield, who was one of the original promoters of the Dayton, Springfield & Urbana, being the president. A. E. Appleyard is managing director and controlling stockholder in all of the properties, while the active management of all of



TYPICAL CROSS-ROADS STATION

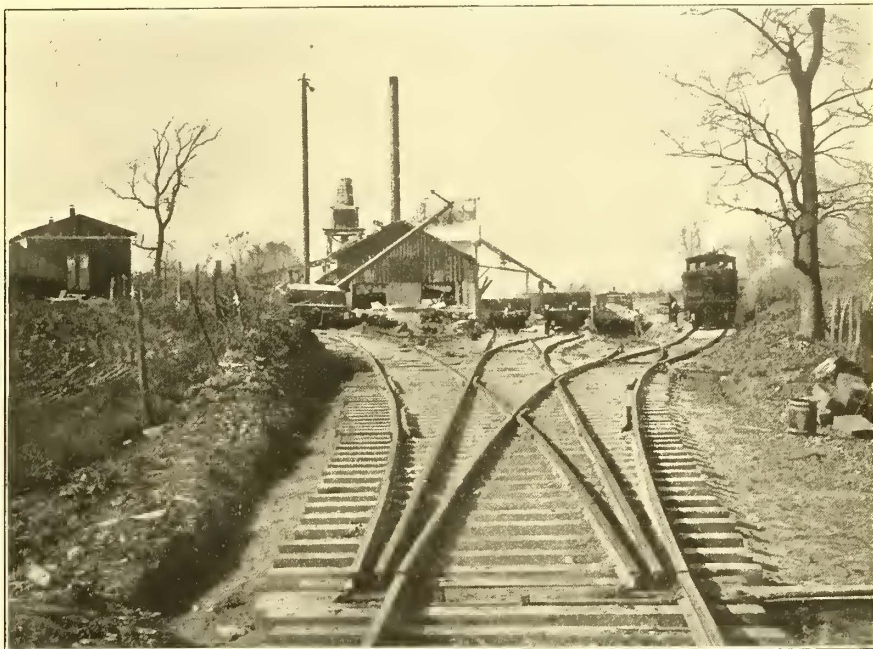
the roads is in the hands of Richard Emory, as general manager, who has his headquarters in Columbus.

The greater part of the work of construction of these roads was planned and supervised by C. A. Alderman, chief engineer of the Great Northern Construction Company, and now chief engineer of the several roads. The writer is indebted to Mr. Alderman for much of the information relating to the details of the road construction, also to H. W. Ginaven, engineer of the Medway power house, for details of the power equipment.

[The second part of this paper, dealing with the power house, sub-stations and distribution system, will be presented next week.]

NEW "L" TUNNEL ROUTE IN BOSTON

The Boston Transit Commission is expected shortly to announce its decision as to the route for the new Washington Street subway. The proposition now before the Commission



STONE QUARRY, ROCK CRUSHER AND SAW-MILL, D., L. & C.

is a tunnel to afford a new way of bringing the elevated trains down town from the present elevated structure at Castle Street, and to give up their route in the present Tremont Street subway to the surface cars which formerly traversed it. The other part of the problem, which may not be taken up until the end of a year, after the completion of the new subway, is a proposition for another surface car subway somewhere near the proposed elevated train tunnel, but separate from the Tremont Street subway. The Commission has no authority under the legislative act to extend either of these new underground routes to Roxbury, and there is no evident intention of providing for elevated trains to East Boston. The whole question is simply one of giving the elevated trains a new route underground from the elevated structure at Castle Street to the Charlestown Bridge; of giving back the whole of the Tremont Street subway to surface cars, and of providing later a new subway for surface cars which now use the tracks on Washington Street.

Indications are that the new tunnel for elevated trains will take a line somewhat to the east of Washington Street, cutting through the wholesale business district, where no through car service exists at present, and connecting with the surface lines of the present subway, the East Boston tunnel and the proposed new subway by transfers at points where the lines cross over or under each other. If the line should be carried direct to the Charlestown Bridge instead of past the North Station a transfer could readily be provided at Haymarket Square, so that through passengers from Roxbury and adjoining points for the North Station would here take surface cars for the railroad terminal. In the same event passengers from the Back Bay and Tremont Street districts, bound for the North Station, would reach that point by surface cars running through the Tremont Street subway, as in the days before the elevated road was built.

The Commission has been engaged on this problem a long time, and has given the subject careful thought, as it is realized that the decision will probably settle future developments in local transportation.

RECENT DEVELOPMENTS IN HIGH-SPEED ELECTRIC TRACTION IN GERMANY

A paper on this subject was recently read by Mr. Reichel, chief engineer of the Siemens & Halske Company, in Germany, before one of the German engineering societies. The proposed electric road between Berlin and Hanover was discussed and some interesting particulars were given of the present high-voltage, high-speed electric railway system of the company. The following is a digest made from an advance copy of the paper:

Mr. Reichel first refers to some of the results secured on the high-speed Berlin-Zossen line. Current was transmitted at 12,000 volts to 15,000 volts, and 2500 hp was taken by the experimental car during starting and 700 hp at full speed. The overhead conductors were made of hard-drawn copper of 100 sq. mm cross section. But in spite of the fact that the highest speed attained was about 45 m per second, no trouble was experienced either with the conductors or collectors. On several

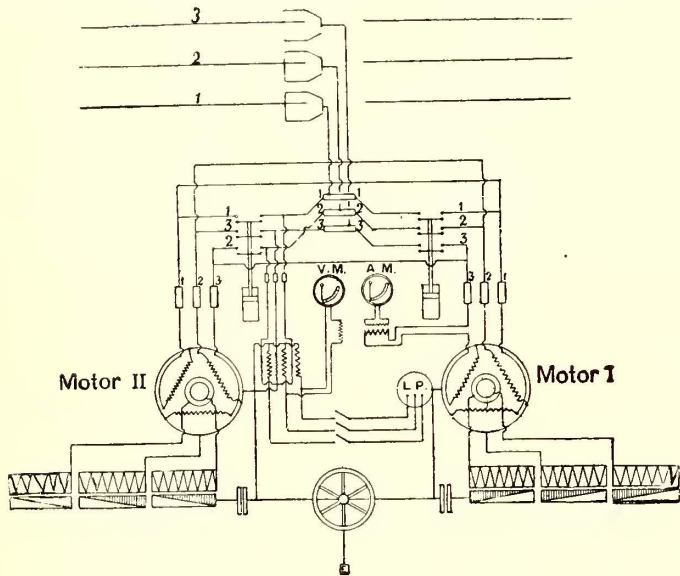


FIG. 1.—WIRING DIAGRAM FOR 2-MOTOR LOCOMOTIVE

occasions a speed of from 150 km to 160 km per hour was attained, and the result of the experiment indicated that no difficulty would be experienced in covering the distance between Berlin and Hanover (230 km) in $2\frac{3}{4}$ hours, ten stops included, or at an average speed of from 120 km to 125 km per hour.

Each of the motor cars easily drew for a distance of 120 km three "trailers" weighing 98 tons, moving in all a gross load of 200 tons. Under these conditions full speed was attained when the train had covered 5 km. From this result it can hardly be doubted that the desired speed of 200 km per hour may be easily attained. The train resistance showed that the power required for this latter speed would be 1400 hp to 1500 hp.

At about the time the Siemens & Halske Company undertook this high-speed work it was also engaged on the electrical equipment of the Berlin elevated railway. On this latter road accelerations up to .7 m per second per second are employed, and retardations up to 1.1 m per second per second. Owing to this great acceleration the average speed is from 25 km to 27 km per hour. This is about 25 per cent greater than that of the Berlin Stadtbahn, a steam line, although on the latter the stops are made at greater distances, namely, 1.4 km as against .88 km. The Berlin elevated railway has recently replaced its 500-600-volt motors with 800-volt direct-current motors. As the increase to 800 volts did not prove harmful to motors, which weigh 1350 kg each, it was determined to build motors weighing 2500 kg for 1000 volts. This attempt has also proved successful, and Mr. Reichel places the limit of safety for a direct-current

railway motor weighing 4000 kg at between 1200 volts and 1500 volts, so that by connecting two such motors in series 2500 volts to 3000 volts could be used as a maximum. He sees no great difficulty in the use of 3000 volts, but it would be necessary to dispense with the third rail and make use of overhead methods of contact.

Mr. Reichel states that it having been shown theoretically that 10,000-volt, three-phase railway motors could be built (see *STREET RAILWAY JOURNAL* for Nov. 8, 1902), practical experiments were made which showed that the windings can carry 20,000 volts alternating current without rupturing the insulation. The first motor made withstood 20,000 volts for one hour, and also successfully withstood a several hours' test running without load at 10,000 volts.

The motors are arranged to be driven either with direct connection to shaft or with gearing. The weight of the motors varies from 4 tons to 5 tons, without gears, and in capacity they range from 180 hp to 250 hp. They can be wound for speeds from 60 km to 160 km per hour.

While these motors are somewhat heavier than low-tension motors, yet the weight of transformers, plus low-tension motors, is in all cases appreciably greater than high-tension motors. In the latter case not only are transformers needless but the car body may also be made lighter, as it would no longer have

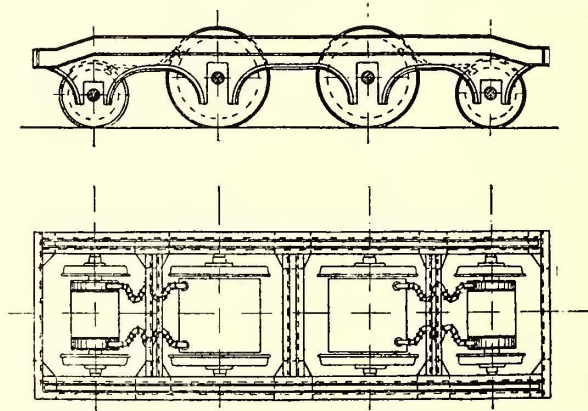


FIG. 2.—ELEVATION AND PLAN OF 4-MOTOR LOCOMOTIVE TRUCK

to bear the weight of the transformers. The efficiency of the motors can also be increased, for if a car is fitted with four motors the primaries of two can be connected for 5000 volts each. This would, of course, reduce the liability of trouble from the motors. In addition to this the wires could be made of larger diameter, and thus the space for the windings used to better advantage. A wiring diagram for a two-motor locomotive is shown in Fig. 1.

Fig. 2 shows the mechanical application of four motors to the truck. It will be seen that the two inner axles are each furnished with 1000-hp motors for wheels 150 mm in diameter. The outside axles are 6 m apart, the wheels being 1000 mm in diameter. On these axles are mounted very light motors connected in cascade to the larger motors when very low speeds are required. These lighter motors make it possible to run a locomotive designed for 120 km per hour at a speed of 60 km or even 30 km per hour by inserting suitable resistances.

Mr. Reichel mentions the fact that under normal conditions the greatest amount of current which can be transmitted through ordinary methods of overhead contact is 100 amps. per contact, and that it is, therefore, necessary to use higher voltages than usual to obtain more energy.

The recognition of the various difficulties experienced with methods of overhead contact led the Siemens & Halske Company to adopt their method of side contact. It was found that even at a speed of 160 km the contact remained good as long as the car was not subjected to rolling or pitching due to poor roadbed.

RELATIVE COSTS FOR STEAM AND POLYPHASE TRACTION

On this subject the following data is given for a trunk railway:

The steam equipment consists of a locomotive tender, four passenger cars and one baggage car, and the electrical equipment of one motor car, which contains a baggage compartment, and four passenger cars.

The track resistance is assumed to be 3.5 kg per ton. For the air resistance the average from the Zossen tests can be taken. These tests showed the resistance to follow practically a parabolic curve. Taking the resistance at 50 kg per square meter of cross section, there would a resistance of 500 kg for 10 square meters. For the friction of current collectors 50 kg may be added as well as an additional 50 kg for the side friction of each trail car, so that for a train consisting of one motor car and four trail cars it would be necessary to use a force of about 1660 kg. This gives, at a speed of 160 km per hour, the following result:

$$\frac{P.v}{75} = \frac{1660 \times 44.5}{75} = 1000 \text{ hp}$$

The air resistance to be overcome by the steam-driven train is greater, because there is additional resistance due to the tender and baggage car, as well as to the less symmetrical shape of the locomotive.

Again, the train resistance on the track increases in direct proportion to the weight. According to Wittfeld this would require a force of 2300 kg, and the normal capacity required of the locomotive would, therefore, be 1400 hp (maximum 1800 hp). The steam consumption would be 1400 kg per hour.

The accompanying table shows the comparison of power required and cost of operation for a steam and electric train.

ST. LOUIS DEDICATORY CROWDS

The experience gained during the dedicatory exercises has convinced the management of the street railway companies, the Fair officials and the public that the Transit and Suburban Companies can care for all of the travel at the World's Fair with perfect satisfaction to their patrons. Notwithstanding some annoyances on Dedication Day, when the service was severely taxed by the moving of half a million persons to and from the West End in almost a solid body, the experience was generally satisfactory.

Interference with the running of east and west cars by intersecting lines will be avoided by the inauguration of safeguards, and the World's Fair traffic will be given the right of way at all junction points. Four tracks will be used by the Laclede Avenue and Chouteau Avenue cars at the south entrance to the park for the World's Fair traffic, doubling the capacity of those lines with a contemplated addition of new cars in proportion. Easton Avenue also will become one of the prominent trolley routes to the Exposition grounds when all of the plans have matured.

The Suburban Company has two lines touching the grounds, and it is contemplated to make both of them popular with the sightseers by equipping them with an abundance of palace cars, such as are now used on the Union Avenue division. The main line of the Suburban, with a large entrance at the Administration Building, penetrating as it does the business center of the city, will become one of the principal World's Fair feeders. The capacity of this branch was not fairly tested on Dedication Day.

When steam railroad tracks are removed from the grounds the street cars will construct permanent terminals; and much

COMPARISON BETWEEN STEAM AND ELECTRIC TRAINS AT SPEED OF 160 KM. PER HOUR

Motive Power	Locomotive		Trail Cars, No.	Total W't in Tons	H. P. Required	Number of Seats.	Weight per Seat in Kg.	H. P. Required per Seat	Cost of Energy per H. P. Hour in Pfg.
	No.	Wt. in Tons							
Steam.....	1	125	5	125 + (5 × 41) = 330	1400	4 (7 × 6) = 168	$\frac{330,000}{168} = 1964$	$\frac{1400}{168} = 8.35$	Coal..... 2.7 Oil and waste 0.27 Water..... 0.13 Total..... 3.1
Electric.....	1	96	4	96 + (4 × 41) = 260	$\frac{(35 \times 260 + 750) 44.5}{75} = 1000$	4 (7 × 6) + 12 = 180	$\frac{260,000}{180} = 1440$	$\frac{1000}{180} = 5.5$	$\frac{7 \times 736}{0.9 \times 1000} = 5.74$

Motive Power	COST PER 100 SEAT KILOMETRES				Cost of Equipment of Complete Train, with Reserve, in Marks	Interest at 3.5% and Payment of 6.5% to Sinking Fund in Pfg.
	Cost of Power in Pfg. for Full Trip.	Cost of Maintenance in Pfg.	Wages in Pfg.	Total Cost in Pfg.		
Steam.....	$\frac{8.35 \times 3.1 \times 100}{160} = 16.2$	$\frac{[45 + (5 \times 15)] 100}{1000 \times 160} = 7.5$	3.75	16.2 + 7.5 + 3.75 = 27.45	1 Locomotive and tender.... 100,000 4 Cars at 45,000 M..... 180,000 1 Baggage car..... 40,000 30 per cent reserve for loco.. 30,000 20 per cent reserve for cars.. 44,000 } 394,000 M	23.5
Electric.....	$\frac{5.74 \times 5.5 \times 100}{160} = 19.7$	$\frac{[45 + (4 \times 15)] 100}{1000 \times 160} = 5.25$	2.8	19.7 + 5.85 + 2.8 = 28.35	1 Motor car..... 50,000 Electrical equipment..... 80,000 20 p. c. reserve for motor car. 26,000 4 Cars at 45,000 M..... 180,000 20 per cent reserve for cars.. 36,000 } 372,000 M	21.

It is apparent from the foregoing that the investment of capital for electric railways is justified wherever the amount of traffic is considerable. If the development of electric trunk lines is to be considered at all it can hardly be doubted that an electric railway between two large cities will certainly prove profitable in time, even though it should take two or three years.



At a meeting of the stockholders of the General Electric Company, held at Schenectady, May 12, the number of directors was increased from thirteen to fifteen. The directors elected to fill these new positions were William C. Whitney, of New York, and Ex-Governor W. M. Crane, of Massachusetts.

time will be saved, both in unloading and taking on passengers and in turning back the cars. Lack of facilities was felt more than anything else during the rush of the dedication.

With the addition of new cars, now being built, the carrying capacity of the Transit Company on its east and west lines will be increased 50 per cent. When the additional tracks have been built and the permanent terminals constructed 450 more cars can easily be pressed into service, and it is expected that this will equip the road sufficiently to handle the business of the World's Fair without difficulty.

Delay in the rush to the West End to see the parade Thursday, April 30, and the return of the crowd after the column had broken was explained by General Manager Du Pont as being

PITS OPEN AT THE SIDES

One variation from the usual practice in pit construction adopted in these shops is to have some of the pits open for a distance of 28 ins. outside of each rail. This is to facilitate working on the outside of the truck from the pit. Considerable work must be done on the outside of a truck, and if this is done with the car standing away from the pit or on a pit track which is not open at the sides, much of this work is done at somewhat of a disadvantage, because it is so near the floor that it is unhandy for the workmen to get at.

The floors are of wood in all the shops. The rails of the pit tracks are supported on timbers, so it is easy to leave an opening outside of the rail on part of the pits. Some of the pits are not open at the sides because when armatures are to be taken out they are lifted with a crane, which is moved about on a four-wheeled truck running on the floor. If the pit is open at the sides it is difficult to use this truck in getting armatures out. Therefore, only a part of the pits are left open in this way. The usual hydraulic lifts worked with oil and a hand pump

For the accompanying perspective drawings showing the plant the STREET RAILWAY JOURNAL is indebted to the courtesy of L. E. Beilstein, general manager of the Toledo Railways & Light Company.

ELECTRIC RAILWAY LEGISLATION IN INDIANA

Nine different acts were passed by the sixty-third session of the Indiana General Assembly, recently adjourned, affecting street and electric railways, and in general they are calculated to encourage the industry.

The act of March 11, 1901, giving street railroad companies power to have condemnation, is amended to include companies organized to acquire property rights as well as those organized to construct, and extending right of way to 66 ft. instead of 50 ft., as formerly.

Another act gives "any street railroad company, heretofore or hereafter organized under the laws of this State, to construct, maintain and operate its street railroad, suburban street rail-

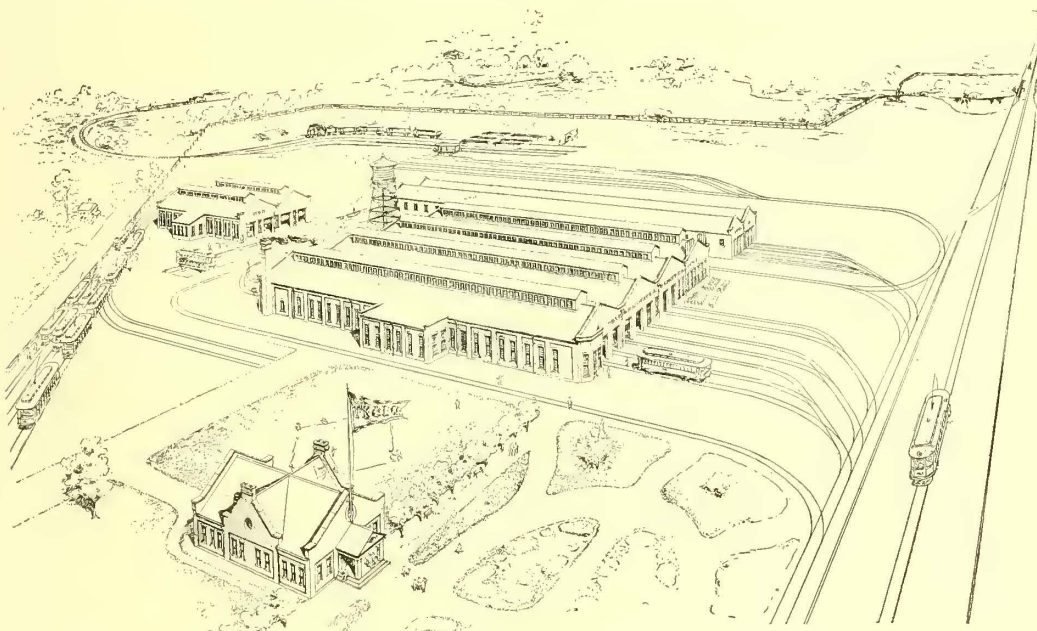
road or interurban street railroad," power to cross "the tracks and right of way in this State of any railroad company" at grade. In such cases the company desiring to cross shall within six months after it commences to use such crossing construct and maintain a system of full interlocking works, to be approved by the Auditor of State.

The act of 1869, often the subject of amendment, authorizing "aid to the construction of railroads by counties and townships taking stock in and making donations to railroad companies," is still further extended so as to include "every kind of street railroad, suburban street railroad, or interurban street railroad," independent of the power used.

By another act "railroads" may avail themselves of the rights, privileges and powers and subject themselves to the duties, obligations and liabilities of interurban electric or street railway companies by filing with the Secretary of State a certificate reciting such desire, properly signed, but neither company is permitted to operate as a steam and electric road. Also, any street railroad company now or hereinafter incorporated under the laws of Indiana owning or operating or possessing a franchise to own or operate a street railroad therein, may sell, lease or otherwise transfer its property to any other company authorized to acquire the same, by a vote of a majority in value of all the shares of the company, given at a meeting of the company called for the purpose.

Still another act authorizes "any street railway or interurban street railway company hereafter organized under the laws of the State" to issue preferred stock not exceeding one-half of the company's total capital stock, and provide in its articles of incorporation that the preferred stock shall be preferred in the division of assets over the common stock, in addition to being preferred in dividends. Companies heretofore organized may have the same privilege by a unanimous vote of all stockholders.

All electric or traction companies operating lines over 18 miles in length are required to provide cars with drinking water and toilet arrangements, and to provide cattle guards and barriers at crossings.



CAR SHOPS FOR THE TOLEDO RAILWAYS & LIGHT COMPANY

are used in the pits, and hydraulic lifts are also to be put in for hoisting car bodies.

LOCATING TROUBLES

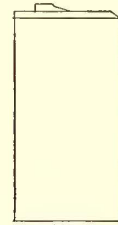
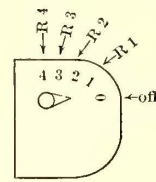
C. O. Brown, master mechanic of the company, is a believer in the plan of keeping extra trucks always on hand to put under cars which come in on account of motor troubles or truck troubles. Although this plan has not always been followed out it is expected that it will be hereafter, because of the several advantages which the reserve truck plan is believed to have. When a reserve truck is kept on hand it can be placed under a disabled car in a few minutes by ordinary pit men, who need have no special knowledge of motor troubles. When the truck with the disabled motors has been taken out the pit men turn the motors over to a couple of men who have an expert knowledge of motors and motor troubles. In this way it is not necessary that every man working in the pits removing trucks and car bodies should have a knowledge of how to locate and remedy faults in the motors. Two skilled men do all the motor testing, both before and after repairs. For motor testing the space adjoining the armature room in the main motor room will be set aside where testing apparatus will be put up. On a lot adjoining the shop a small office building with lounging rooms for the employees, lockers, etc., is to be built. The paint shop is an entirely independent building in the rear of the main shops, as indicated, and is served by a 50-ft. transfer table.

ELECTRICALLY OPERATED BRAKE FOR STREET RAILWAY SERVICE

The Rochester Railway Company has developed an electrically-operated brake, designed for service on city and suburban lines. For several years the company has been studying the problem of braking, and has investigated the merits of several forms of equipment, but has never found one that would meet its particular requirements, entirely satisfactory to the management. In the development of the brake mechanism here described the company's engineers have conducted an exhaustive series of tests to determine efficiency of operation, reliability of the apparatus under the most trying and unusual conditions and the amount of power required for operating it. This investigation has been conducted under the immediate personal direction of Alfred Green, the chief electrician and master mechanic of the system, assisted by E. Burns and Fred. Strail, and the present equipment is the result of experimental work along this line.

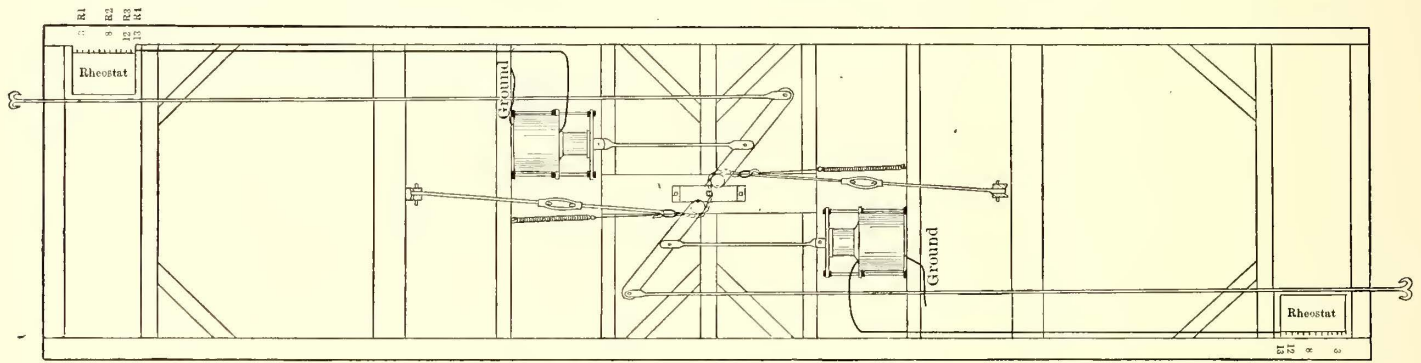
The brake mechanism itself is every simple, as will be

although this is not recommended by Mr. Green, as he believes that in most cases the motors have all they can do to propel the car without being burdened with any brake mechanism.



Street Railway Journal
CONTROLLER

It has been the aim of the inventor to make the equipment as simple as possible in order that it may be employed on small systems which cannot afford the expense of a brake expert. During the experiments on the Rochester lines the care of this equipment has been left entirely to the motorman without any special instructions beyond those given in the course of a run in which any experienced motorman can become thoroughly familiar with the operation of the controller. This is due to the fact that there are very few moving parts in the mechanism and comparatively few wearing parts. There is nothing to wear out on the cylinder, and the only remaining mechanism to require attention is the controller, which is really much more



ARRANGEMENT OF BRAKE UNDER CAR

Street Railway Journal

realized after an examination of the accompany sketch showing its arrangement under an ordinary motor car. In this brake power is applied for retarding the car much after the same manner as an air brake, and the tests to which it has been subjected show that it acts quickly and positively and releases as promptly, and, moreover, that it puts no additional strain on the motors. It will hold a car on a grade, and it is capable of very fine adjustment and regulation. The pressure of the brake can be varied at will and as readily as in the case of a hand brake.

A feature of this equipment is the fact that the power brake is operated through the ordinary brake staff, but this in no way interferes with the hand brake; consequently, there is an added advantage that in the event of failure, through any cause, of the electric brake responding, the hand brake is always ready for use, and the motorman is not called upon to change his hand from one lever to another.

By reference to the cut it will be seen that the brake proper comprises two cylinders. These contain three magnetic coils each and a plunger, which is directly connected to the equalizing lever under the car. Connecting wires lead from these coils to the controller, which is placed alongside the brake staff and geared to it, so that the turning of the brake staff applies the power to the magnetic brake.

The total weight of the brake equipment is less than 350 lbs. for a 30-ft. car body. Ordinarily the amount of current required for operation is 4½ amps., and an emergency stop, which will slide all the wheels, can be made with 5½ amps. The cylinders exert a piston pull of 7½ ins..

The controller is arranged with five notches, four of which are used for regulating the amount of current used and giving a varying pressure to the brake-shoe. The fifth notch is used in the event of the trolley wheel leaving the wire when the motors may be short-circuited through resistance. If desired, the current generated by the motors may be used for all stops,

simple than the ordinary motor control, as it is called upon to handle less than 5 amps. of current.

The present equipment has been in regular service several months, and, in addition to this work, it has been successfully subjected to very severe trials.

THE VON HOFFMAN SINGLE-PHASE RAILWAY SYSTEM

Albert Von Hoffman, Milwaukee, Wis., who will be remembered by street railway men as the inventor of the Falk Cast Welded Joint, has announced, through the daily press, that he has invented a single-phase system of electric railway. No details as to the new system are announced, however.

The advantages claimed for the new system are those which would be common to any successful single-phase electric railway system, namely, the elimination of rotary converter substations and the use of a high voltage on the trolley wire without the necessity of more than one trolley wire.

SINGLE VS. MULTIPLE STATIONS FOR HEAVY RAILWAY SERVICE

At the meeting of the American Institute Electrical Engineers, in Chicago, May 5, in the course of the discussion on the tendencies of central station development, Bion J. Arnold said that his recent studies of the subject of power houses for supplying heavy service railways had led him to the belief that a number of direct-current stations scattered along the line were better for this purpose than one large generating plant with high-tension transmission. He had in mind especially such service as the New York Central terminal, and his conclusions were, of course, made in connection with the consideration of this problem.

ELECTRICITY ON TRUNK LINES

C. L. De Muralt, an engineer of the Oerlikon Company at Zurich, Switzerland, who has done important work in heavy electric traction, has written an article for the May issue of the "North American Review" on "Electricity as a Motive Power on Trunk Lines," in reply to one on the same subject by Cornelius Vanderbilt.

Mr. De Muralt adopts Mr. Vanderbilt's points of classification for purposes of comparison between steam and electric traction, viz.: First, cost of a unit amount of fuel; second, amount of useful work realized from this fuel at the driving wheels; third, cost of transportation or handling trains; fourth, cost of repairs to machinery; fifth, cost of repairs to roadway.

Regarding the first point Mr. De Muralt considers the cost of fuel to be the same in both cases. Passing on to the second point he assumes that the traction company buys its current from some power company at about $\frac{1}{2}$ cent per horse-power-hour. Deducting 40 per cent for transmission losses the cost of horse-power-hour at the drivers would be about 0.8 cents. Mr. De Muralt says that a passenger train, weighing about 250 tons, running at 35 miles per hour, would take about 8-hp-hours per train-mile, and a freight train, weighing about 800 tons, running at 15 miles per hour, would take about 17-hp-hours. The author concludes that the cost of electric motive power per train-mile would be about $6\frac{1}{2}$ cents for passenger trains and $13\frac{1}{2}$ cents for freight trains. If water-power be used, Mr. De Muralt believes that these costs might easily be 4 cents and $8\frac{1}{2}$ cents respectively. While the performance of the steam locomotive cannot be given so readily, Mr. De Muralt places the average cost of steam-power per train-mile at about 6 cents for passenger trains and 15 cents for freight trains.

Referring to the third point, the cost of transportation or handling trains, the author states that even if the cost of the unit of energy at the driving wheels be the same in either case, it does not follow that the total cost of motive power will be the same. The weight of an electric locomotive required to haul a given load will be much less than that of a steam locomotive of equal capacity. A steam locomotive weighing 60 tons will have a tender weighing 30 tons and about 10 tons more in coal and water, making a total of 100 tons of which little more than half rests on the drivers. An electric locomotive weighing about 50 tons, having its total weight on the driving wheels, will, therefore, do as much work. If the electric locomotive were combined with one of the cars, the reduction in weight would be still greater. Mr. De Muralt estimates that this advantage alone should effect a saving of 5 per cent. He also states that another 5 per cent could be saved in switching, as an electric switching locomotive would only take power when needed. Mr. De Muralt thinks about 25 per cent can be saved in wages.

Considering the fourth point, the cost of repairs to machinery, Mr. De Muralt says that, while the cost of maintaining the cars would be the same in either case, at least 50 per cent should be saved on repairs by using electric instead of steam locomotives.

Taking up the fifth point, the relative cost of repairs to roadway, the author believes this item would be the same in either instance.

In conclusion, Mr. De Muralt considers the question of first cost, and takes for examples the Pennsylvania Railroad and the New York Central & Hudson River Railroad, the former operating 3670 miles and the latter 3220 miles. With an alternating-current, high-potential system the electric equipment of the line would not cost more than \$6,000 to \$7,000 per mile, including second, third and fourth tracks and sidings, or a total of \$25,690,000 for the Pennsylvania, and \$23,240,000 for the New York Central. If 10 per cent be counted for interest, etc., this would represent an annual charge of \$2,569,000 in the one case, and \$2,324,000 in the other.

The operating expenses of these two roads are given as follows:

	Pennsylvania	N. Y. Central
Fuel for locomotives (motive power)	\$6,000,133.94	\$4,635,877.09
Water for locomotives	335,286.00	295,582.77
Other supplies for locomotives	382,548.12	334,672.56
Wages of engineers, firemen and roundhouse-men	5,716,847.83	4,829,442.54
Wages of other trainmen	4,442,127.34	2,991,334.66
Wages of switchmen, flagmen and watchmen	3,900,427.49	2,511,552.06
Other expenses for conducting transportation	14,540,541.88	11,607,537.54
Repairs to locomotives	4,412,983.29	3,608,971.89
Repairs to other equipment	10,674,725.61	5,661,991.79
Repairs to roadbed	8,541,935.48	6,145,341.10
Repairs to structures.....	4,122,017.98	2,454,600.90
General expenses	1,858,319.09	1,786,494.17
Grand Total	\$64,927,894.05	\$46,863,489.13

Applying the figures found during his investigation Mr. De Muralt allows the following reductions if electricity be adopted:

	Pennsylvania	N. Y. Central
Fuel, 10 per cent, or	\$600,013.39	\$463,587.71
Water, saved entirely	335,286.00	295,582.77
Other supplies, 50 per cent	191,274.06	167,336.28
Wages to engineers, etc., 25 per cent.	1,429,211.96	1,207,360.63
Repairs to locomotives, 50 per cent..	2,206,491.65	1,804,485.95
Total amount saved	\$4,762,277.06	\$3,938,353.34

From these figures the writer concludes that the amount saved would be almost double that necessary to pay a handsome return on the additional investment. Mr. De Muralt says that if a railroad like the New York Central received its current from water-power at Niagara Falls, upper Hudson River and the St. Lawrence River, this would represent a yearly saving of more than one and one-half million dollars.

Even with these convincing figures Mr. De Muralt does not advise changing an entire trunk line system at once to electric traction, but recommends doing so gradually. The steam equipments displaced on one section of the road could be used on other parts instead of buying new steam locomotives. No interruption in traffic would take place, and the change could thus be made without interfering with the regular operation of the road.

ELECTRIC PROJECT FOR QUEBEC

A report that has just been made to the Department of State at Washington, says that a project for an extensive electric railway system through the south shore counties and eastern townships of Quebec is now in tangible form. It is understood that two main lines will be commenced this season, one to connect Montreal with St. Johns by way of Longueuil and Chambly, and the other between Montreal and Valleyfield, closely following the bank and taking in St. Lambert, Leprairie, Chateaugay and Beauharnois. There will also be parlor coaches for private parties.

It is claimed that this will be one of the largest electric railway systems in Canada, and it will form a connecting line in a system of electric railways that will eventually connect New York with Montreal. Among the systems that will make up the through line, besides the Montreal & Southern Counties Railroad, are the United Traction Company, of Albany and Troy, the Bennington & Hoosick Railroad, the Hudson Valley Railway, the Troy & New England Company, and the Berkshire Street Railway Company, with about fifteen other corporations of less importance. The Montreal & Southern Counties Railway route will have the scenic advantages of the Richelieu River and St. Lawrence River, and it will enable the farmers all along the south shore to reach the markets of Montreal with their products.

CORRESPONDENCE

THE GEOMETRY OF THE BOSTON SYSTEM

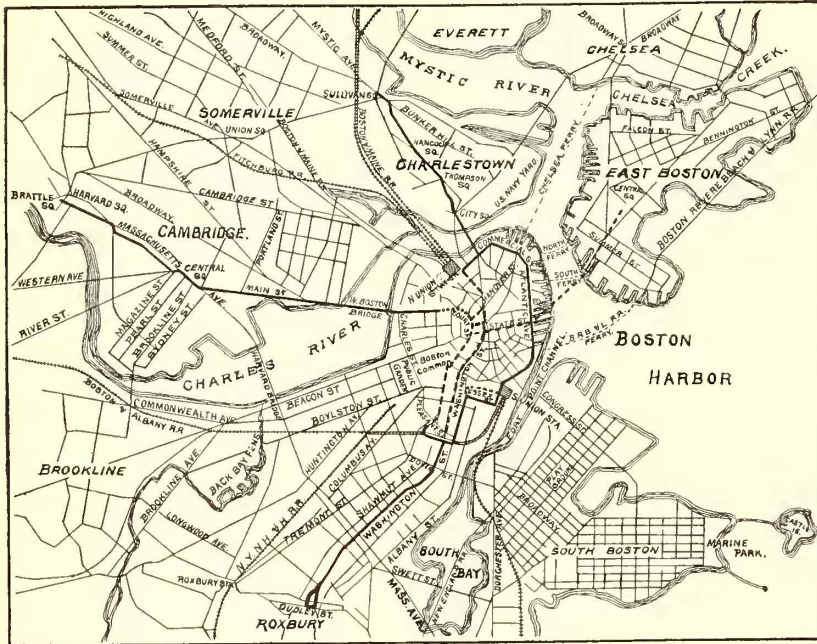
BOSTON, MASS, May 2, 1903.

EDITORS STREET RAILWAY JOURNAL:

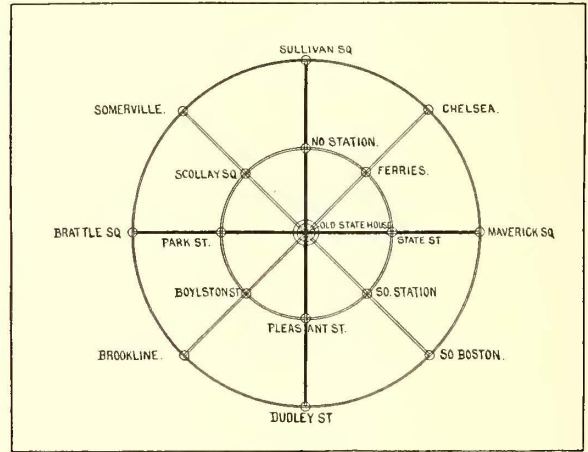
It is probably not yet understood, even by a majority of street railway experts, how closely the present and projected achievements of the Boston Rapid Transit management conform to an

lines, from the central focus, and other surface lines connect the outgoing spokes.

Such, with numerous deviations due to topography, will be the Boston street railway proposition of ten years hence. And it is an interesting question if this geometric plan is not the normal ideal for any large community that has a single definite business center with its suburbs extending outward in every direction. Certainly nothing more convenient and workable could be devised for a prairie city just laid out in accordance with the cartwheel principle. It might not do for Chicago or Philadelphia, and quite likely it would not apply to New York, where the natural parallelogram of Manhattan Island has seemed to necessitate other arrangements, though it is a fact that a recent writer has suggested the possibility of a central circuit, similar to the Atlantic circuit in



MAP OF BOSTON, SHOWING STREET RAILWAY SYSTEM



BOSTON SYSTEM, DIAGRAMMATICALLY SHOWN

ideal cartwheel arrangement. Certainly most people would think that because Boston is a city presenting unusually complex and perplexing topographical problems, its transportation arrangements must be similarly complex. As a matter of fact, however, they are, in theory, exceedingly simple. It is hard, of course, to say whether the unity of the design was fully appreciated or not by the officials of the Boston Elevated Railway Company when they first took up their task of developing a system of rapid transit for the Hub, but it subsequently has become certain that after the Washington Street subway, the tunnel to East Boston and the elevated line to Cambridge have been completed the entire street railway proposition will exhibit a geometric principle that any schoolboy might explain to his parents. It is in fact the principle of the hub and wheel applied—as may be seen from consulting the accompanying actual map of greater Boston—with remarkable consistency when one considers the numerous engineering difficulties involved.

Starting with the conception which the Boston engineers have always held that the subway and elevated lines represent conjointly one distinct type of transportation and the surface lines quite another, we see that the city will very shortly be covered by the central "Atlantic" circuit—which is already in operation—composed of subway on the west side and elevated on the harbor side, and cut diametrically by two elevated-subway trunk lines, the one extending from Sullivan Square, Charlestown, through the projected Washington Street subway to Dudley Street, Roxbury; the other running in similar fashion as an elevated road from Brattle Square, Cambridge, crossing the Charles River and piercing the heart of the city as a subway past the Old State House, soon to be the strategic center of the whole system, down State Street and beneath the harbor to Maverick Square, East Boston. Surface lines also radiate outward, as indicated in the theoretical design by the lighter

Boston, to include South Ferry, the Manhattan end of Brooklyn Bridge, Canal Street and Cortland Street Ferry, together with four grand trunk lines leading outward respectively to the Bronx, to Brooklyn, to Newark and to Staten Island; the whole system to be articulated and to offer those privileges of transfer at intersecting points which make it possible for Bostonians to go farther and faster for a nickel in their home towns than they can go anywhere else.

An important consideration in following out such a geometric plan is, of course, the development of an effective transfer system, and this is the direction progress is taking just now in the New England city. Six new transfer stations have been opened recently, and others will follow as conditions of traffic warrant. It is said to be the experience of the Boston Elevated Company that freedom of transfer tends to shorten the average haul and that it also prevents congestion in the central district. In other words the scheme of "anywhere for a nickel" tends to equalize loads throughout the metropolitan district. Of this a striking example is to be noted in the operation of the newly-opened transfer station at the corner of Massachusetts Avenue and Beacon Street, which cuts off more than 2 miles of the journey between Cambridge and Brookline. Heretofore, on account of lack of direct communication between these two populous and wealthy suburbs traffic has gone "in town" as far as the Boylston Street station in the subway and thence out again, thereby involving an unnecessary haul for the company and unnecessary inconvenience to passengers.

F. W. COBURN.

CAR HOUSE CONSTRUCTION

BROOKLYN HEIGHTS RAILROAD COMPANY

BROOKLYN, N. Y., April 25, 1903.

EDITORS STREET RAILWAY JOURNAL:

I have examined carefully the article on "Car House Con-

struction," in the STREET RAILWAY JOURNAL for March 14, and consider it a very timely one.

I have been endeavoring for the last two years to get some style of construction that would be acceptable to both the Board of Fire Underwriters and the City Building Department. If the insurance experts have succeeded in accomplishing this they have certainly made a step in the right direction. I have prepared plans in accordance with their specifications, and although they are not in accord with the requirements of the building code, we hope to have them accepted as standard construction by the building department. If we are successful in getting the two departments on record as approving this construction, so as to avoid continual changes during the erection of the building and afterwards, it will mean the saving of many dollars annually that have had to be spent heretofore to keep our constructions in accordance with the "most recent requirements" of the two departments referred to.

J. C. BRACKENRIDGE
Chief Engineer.

PROTECTED THIRD-RAIL ON THE WILKESBARRE & HAZLETON RAILWAY

L. B. STILLWELL, CONSULTING ENGINEER, PARK ROW BUILDING, N. Y. CITY.

May 6, 1903.

EDITORS STREET RAILWAY JOURNAL:

Replying to your inquiry regarding the operation of the protected third-rail system between Wilkesbarre and Hazleton during the last winter, I would say that on the whole it has been extremely satisfactory. The advantages resulting from protecting the contact-rail against sleet were strikingly manifested on several occasions. One of the sleet storms was accompanied by a very high wind, and in some places the more exposed edge of the rail-head was reached by the sleet. This, however, was not in sufficient amount to interfere materially with operation.

The collecting shoes require some modification in order to enable them to deal with snow. We had one very heavy snow-storm, the depth of snow in some of the cuts being approximately 3 ft. The shoe in use has a tendency to press some of the snow down upon the rail by a kind of ironing process. Improvements have been developed which we hope will meet the difficulty, but the first set of modified shoes reached Hazleton too late for actual trial during the winter season which has just passed. I regard the shoe, even as it stands, as a material improvement upon the link shoe in general use upon elevated railways, but it is capable of further development.

L. B. STILLWELL.

ELLIPTIC VS. SPIRAL SPRINGS ON TRUCK BOLSTERS

Some interesting trials have been made by the St. Louis Transit Company lately as to the relative easy riding qualities of spiral as against elliptic springs when placed on the bolsters of Du Pont swivel trucks. These trucks are the ones employed under double truck cars by the St. Louis Transit Company, and experiments were made to determine whether elliptical or spiral springs were the best for the bolster springs. W. O. Mundy, master mechanic, reports that the spiral springs on the bolsters proved very much easier riding than the elliptical springs for city service. Of course, the springs between the truck frame and the journal boxes were spiral springs in both cases, as on all Du Pont swivel trucks. The explanation of the easy riding qualities of the truck equipped with spiral springs on the bolsters, with all other conditions the same, is that the spiral spring takes up better the small, yet sharp, vibrations incurred on city track. Steam road experience, the results of which are

shown in the standard M. C. B. passenger truck, is that elliptic springs have been found best suited for that class of work, and this is probably due to the fact that the vibrations experienced on a steam railway track are much longer than on city street railway track.

AN INTERURBAN CAR TEST

The essential data are published below of a car test recently made on an interurban line, 16 miles long, running between two towns at the sea level. The maximum grade of the strictly interurban section of the line is about 3 per cent; and the track is especially adapted to speeds of 40 miles per hour maximum.

The car weighed, loaded with passengers, about 20 tons, and was equipped with four General Electric 67 (38 hp) motors, the gear ratio being 57 to 27 or 2.11. The power station is located in one of the towns near the end of the line, and the generator voltage at full load was 625. Direct-current distribution is employed, two 500,000-circ. mil. feeders supplying about 7.5 miles of private right of way line with power through a No. 00 B. & S. trolley. Beyond the private right of way section the line runs mostly on highways through scattered settlements of the other terminal town, and is fed by a No. 0000 feeder about 6 miles long. The track rails are 60-lb. T-section, well bonded, and connected with salt-water grounds at several points. The town section near the power station is about 2.5 miles long, and is fed only by No. 00 trolley. Three 20-ton and one 12-ton car were in operation during the test, including the car which carried the voltmeter and ammeter in addition to passengers. The maximum grade on any section was 5 per cent.

The voltmeter and ammeter readings showed an average of 570 volts, 63 amps. at the car in passing over the town section nearest the power house, series operation of the controller being followed in the streets. The section (2.56 miles) was covered in 14.3 minutes at a schedule speed of 10.8 m. p. h., and the energy consumption in watt-hours per ton-mile was 146, stops being made at the rate of 5 per mile or 6 per mile. The minimum voltage was 460, and the kilowatt-hours per car-mile 3.36. The average power taken by the car was 36 kw.

The strictly interurban section was 7.29 miles in actual length, and but two stops were recorded in this portion of the run. The distance was covered in 16 minutes 40 seconds, at a schedule speed of 26.2 m. p. h. The average volts at the car were 530, the average amperes 73.5 and the power consumption 39 kw. The energy consumption was 1.47 kilowatt-hours per car-mile, or 64 watt-hours per ton-mile.

In the run of 6 miles through the more settled district of the town at the other end of the line, the distance was covered in about 19.7 minutes at a schedule speed of 18.1 miles per hour. The line voltage at the car averaged 443, the current averaged 75.5 amps., and the kilowatts 33.2. The kilowatt-hours per car-mile were 1.82 and the watt-hours per ton-mile 79. The minimum voltage was 230, which was reached at the end of the line when the four motors were thrown in full multiple, thereby taking 270 amps. Normally in acceleration the car's maximum current was about 250 amps. in full parallel.

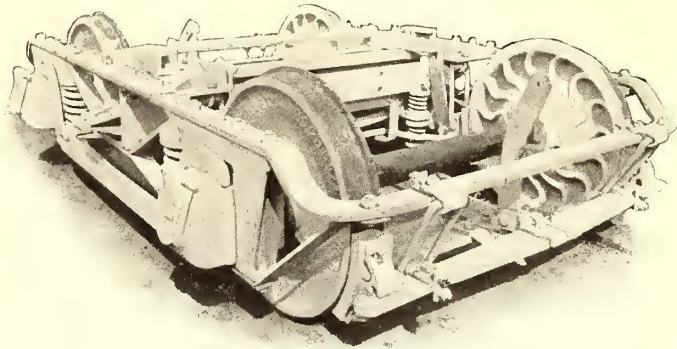
The round trip covered a distance of about 31.5 miles, which was traversed in 1 hour 57 minutes. The total energy consumption of the car averaged 1.63 kilowatt-hours per car-mile, or 71 watt-hours per ton-mile, and the schedule speed was 16.1 m. p. h.

The maximum speed reached on the interurban section was 42.5 m. p. h.

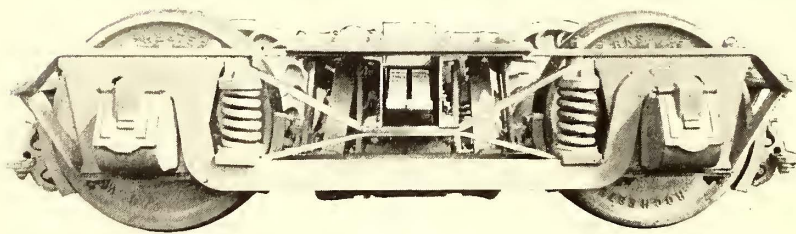
The United States Light & Traction Company, of Denver, Col., is reported to have purchased the property of the Salem Light, Power & Traction Company, of Salem, Ore.

NEW TRUCK FOR NEW JERSEY CARS

The New Jersey & Hudson River Ferry & Railroad Company is having built at the works of the John Stephenson Company, a type of truck designed by C. F. Uebelacher, of Ford, Bacon &



END VIEW OF TRUCK



SIDE VIEW OF TRUCK

Davis, managers of the railway company. The truck, which is illustrated in the accompanying engravings, is somewhat similar to those which are known in electric railway work as M. C. B. trucks, although these trucks are quite different from the M. C. B. trucks used in steam railroad work. No very novel features are found in Mr. Uebelacher's construction, but he has combined a number of old principles in a new way, with the object of securing an inexpensive and simple construction, with durability and easy riding properties.

The frame, as will be seen, is what is known as the diamond frame, and is provided with cast-steel pedestals. No springs

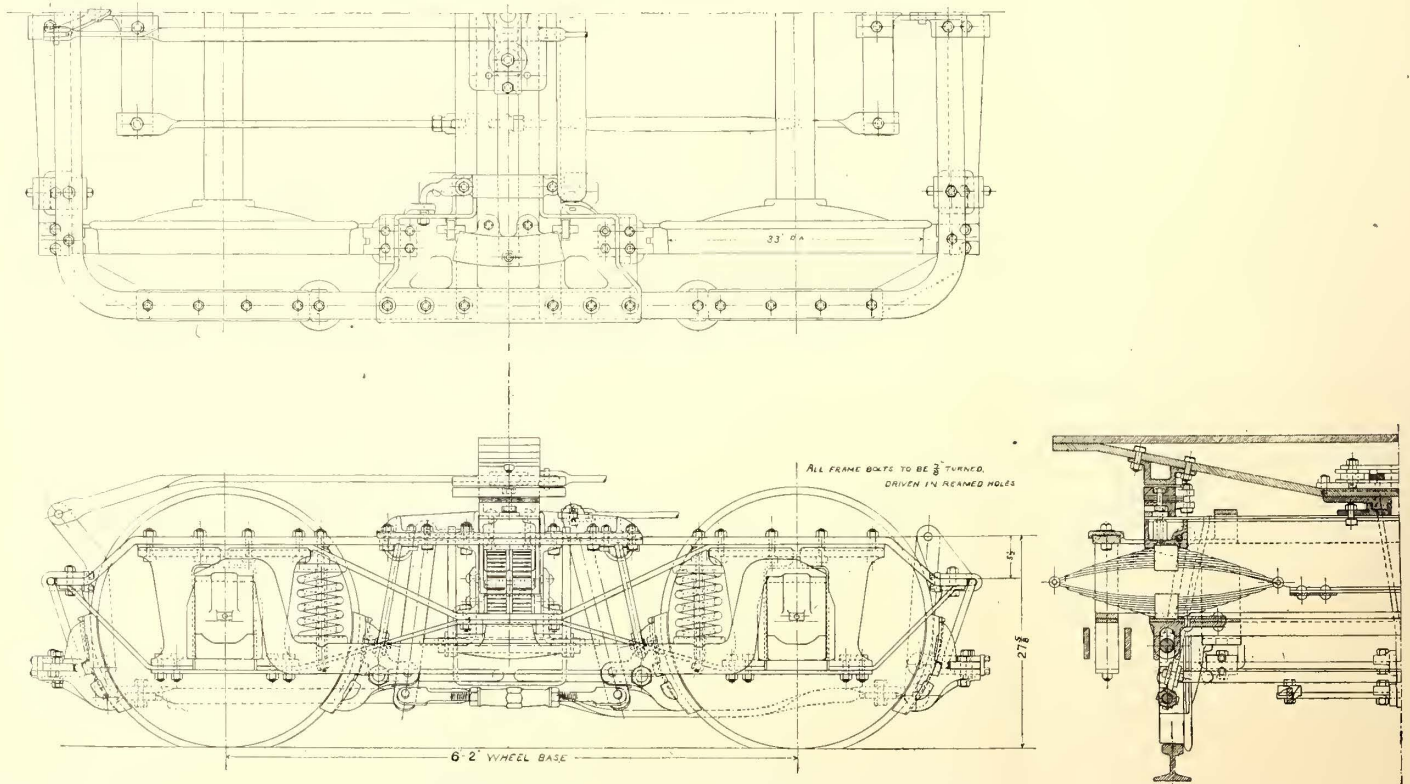
are used over the journal boxes, as the frame is carried directly on the four spiral springs, two on each side, which are supported on the equalizer bar. These springs have been moved as near to the ends of the equalizer bar as possible, so as to fulfil the two functions of equalizer springs and journal springs. The elliptical springs on the swinging bolster are four in number. The gusset plates should also be mentioned, as they take the place of some eight or nine parts in the ordinary truck. They are of malleable iron, and are bolted securely to the frame. Beside acting as a guide to the bolster they connect the channel-iron cross beams and at the same time carry the bolster links as well as the hangers for the inside brakes.

Possibly the most novel feature of the truck is the rigging for the outside brakes. To get to the sway bars at each end of the truck, the brake rod for the outside brakes is carried close to the middle of the body bolster between two rollers. In this way the use of the usual curved floater is avoided. It is the intention to connect the inside brake rigging with the power brake cylinder, and to operate the outside brakes by hand bar.

The truck is constructed to receive two motors, and weighs without motors about 7500 lbs. The car bodies under which these trucks are designed to run will weigh with load about 60,000 lbs. each.

IMPROVEMENTS AT THE INGERSOLL PARK, DES MOINES

In connection with the general improvements being made by the Des Moines City Railway Company, of Des Moines, Ia., this spring, Ingersoll Park, owned by the company, is being improved for the summer season. A large theater of elegant design, painted white, is being constructed. It is built from designs suggested by President J. S. Polk, of the company. It will seat 3500 people, and room can readily be made for 500 more. The interior is to be fitted with at least 1000 incandescent lights. A matched floor will cover the entire ground space beneath the oval umbrella-shaped roof. The company has bought 1500 folding opera chairs, pews and settees for the rest of the theater. A moving picture machine will be placed in the center of the balcony. As to the stage section it will be regula-

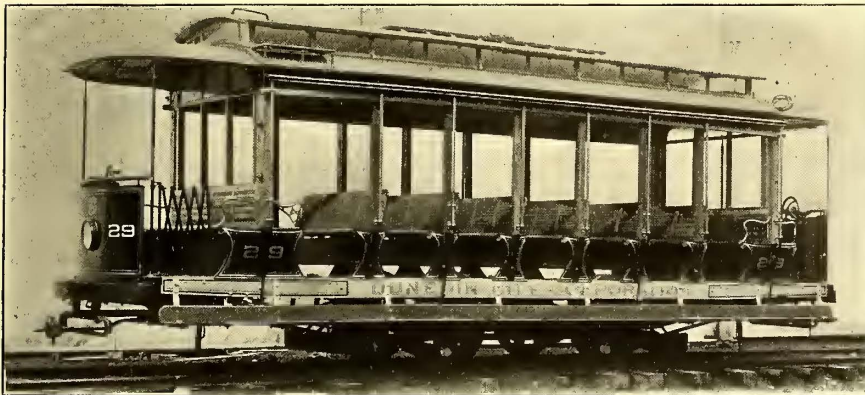


HALF PLAN, SIDE AND END ELEVATION OF TRUCK

tion style, with box scenery as well as the latest lift scenes, strong foot-lights, magnificent side lights for spectacular effects, and there will be fifteen dressing rooms to start with, though several others can be provided if required. The proscenium will be 34 ft. wide and about 26 ft. high. The frontage is to be elaborately painted and faced with lights. The immense height of the stage enclosure will give room for a great quantity of scenery. A unique scheme is provided for getting into and out of the balcony or gallery. At the west side of the pavilion an entrance is made that will be on a level with the ground of the park, a broad enclosed walk leading from the hill directly into the gallery. This will do away with climbing of stairs to get into the balcony.

CARS FOR NEW ZEALAND

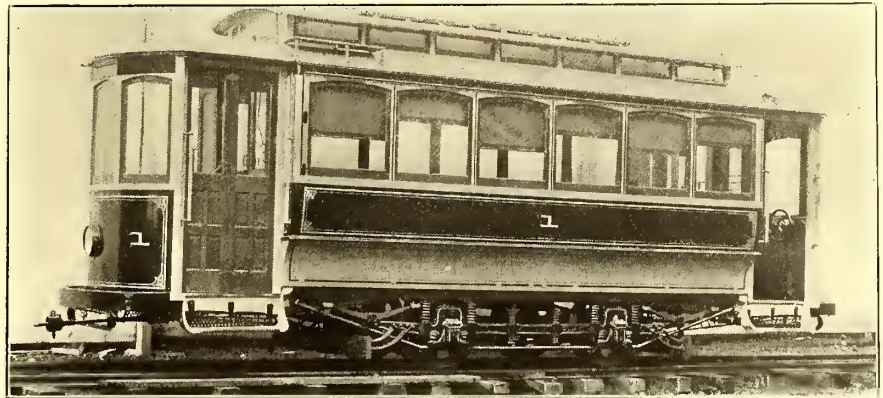
In the issue for Sept. 6, 1902, of this paper, some details of the proposed equipment of the Dunedin (New Zealand) Tramways with electric power were published. The road is being installed by Noyes Bros., of Sydney, N. S. W., and members of this firm were in this country last fall and again this spring for the purpose of ordering equipment for the Dunedin system.



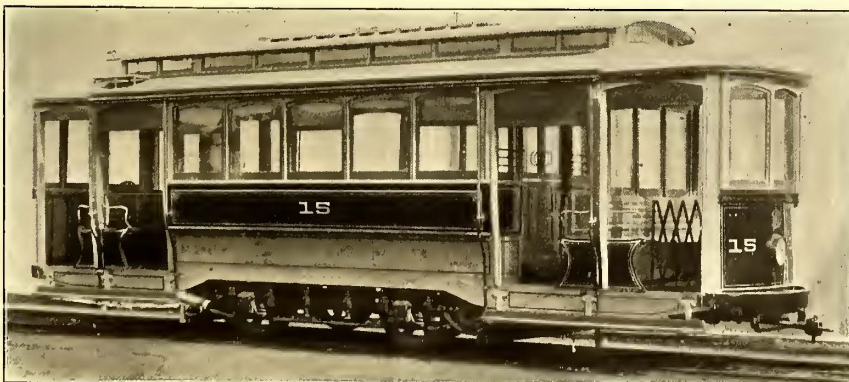
OPEN CAR FOR DUNEDIN

On the first visit orders for thirty-four cars were placed with the J. G. Brill Company. These cars have been recently completed and shipped, and are of three types, fourteen Californias, fourteen standard closed and six standard open.

The California cars are of a novel type, as they have under each side sill a pair of deep angle-irons, which are offset and prolonged to carry the platforms, which in turn are dropped, as shown in the illustration. These angle-irons carry the entire weight of the platforms, and thus relieve the car body from a great strain. Besides the strength



CLOSED CAR FOR DUNEDIN



CALIFORNIA CAR OF NOVEL TYPE FOR DUNEDIN

added to the car by this improvement the platforms are brought down as low as those of an ordinary closed car, the riser being but 12 ins. and the step to the rail head but 13 ins. The body is 13 ft. 5½ ins. over the end panels, and has longitudinal seats with room for eighteen passengers. The interiors are finished in quartered oak, with ceilings of the same material. The open portions are 7 ft. 9¼ ins. from end panels over crown pieces, making a total length of car over crown pieces of 29 ft. There is seating on the platforms for twenty passengers, making a total seating for the car of thirty-eight. The platforms are protected with curtains, which may be drawn to the floor, as the seat-end panels are of the round-corner style. The width of these cars over sills is 6 ft. 2 ins., and over posts at belt, 7 ft. 1 in.; sweep of posts, 5 ins.; thickness of corner posts of closed compartment, 3¾ ins., and of open, 3¼ ins.; side posts of closed compartments, 1¾ ins., and of open, 2¾ ins.; side sills, 4¼ ins. x 5¾ ins., plated with angle-iron. The total weight of car and truck is 13,225 lbs.

The closed cars are of the builders' standard 18-ft. design, with round end vestibules sheathed with steel. The length over vestibules is 27 ft. 5 ins.; from end panels over crown pieces, 4 ft. 8½ ins.; width over sills, 6 ft., and over posts at belt, 7 ft. 4 ins.; sweep of posts, 8 ins. The side sills are 3½ ins. x 5½ ins., and end sills, 3½ ins. x 4½ ins. The thickness of corner posts is 3¾ ins., and of side posts, 1¾ ins. The heights of steps and risers are the same as in the Californias. The interior finish is of quartered oak, with ceilings of the same material, decorated. The total weight of the car and truck is 10,400 lbs.

The open cars are also of standard design. The general dimensions are as follows: Length over crown pieces, 28 ft. 8¾ ins.; from center of corner posts over crown pieces, 4 ft.; width over sills, 6 ft. 2 ins.; width over posts at belt, 7 ft. ½ in.; sweep of posts, 5 ins.; from center

to center of posts, 2 ft. 8 ins.; thickness of corner posts, 3¾ ins., and of side posts, 2¾ ins. The side sills are 3¾ ins. x 7 ins., plated with ½-in. x 7-in. steel. The total weight of car and trucks is 12,000 lbs.

The Californias and open cars have folding gates, and all the cars are furnished with specialties of the builders' patented designs. The cars are all well mounted on 21-E trucks, with 6-ft. 6-in. wheel base and 33-in. wheels.

The Dunedin system will be operated temporarily by steam, but the construction of a water-power transmission plant is now being considered.

NEW ENGINEERING BUILDING

Plans have just been completed for a new engineering building, to be erected for the University of Pennsylvania, at Thirty-Third Street and Locust Street, Philadelphia, Pa.

The building is to be 300 ft. long and 160 ft. deep, with a wing 50 ft. wide on the west end, extending 40 ft. further to Chancellor Street in the rear. It is to be three stories high, with a basement covering about one-third of the area. The total floor space available in the building will be approximately 128,000 sq. ft., distributed as follows:

	Square Feet
Basement	15,600
First floor.....	47,000
Second floor.....	32,600
Third floor.....	32,600
Total	127,800

A storage battery room, to be used in connection with the electrical laboratories, will be located at the west end of the basement. On the west end of the first floor will be a testing room for the calibration of indicators, thermometers, calorimetric work, with fuels, etc., and beyond that an electrical standard room for the comparison and correction of electrical testing apparatus of every variety. The remaining mechanical and electrical laboratories will be situated on a floor 4 ft. below the entrance hall.

To the west and north of the woodworking and pattern shops on the first floor will be the mechanical laboratory and a part of the electrical laboratories. At the western entrance will be a dynamo and motor room, in which direct-current work will be carried on. Provision for high-voltage and railway work will be made in the adjacent laboratory.

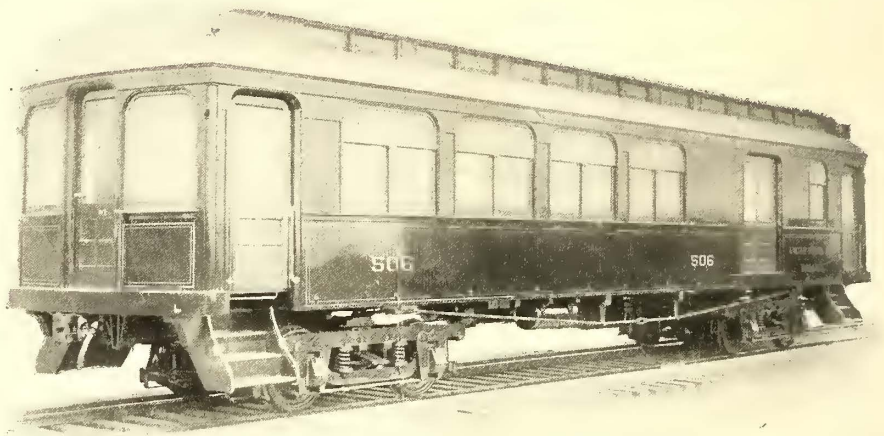
In the mechanical laboratory steam and gas engines will be installed, each installation being complete with its apparatus for doing the special kind of testing for which it is to be used. Apparatus will be installed for measuring power transmitted and for testing the materials used by the mechanical engineer. Adjacent to this laboratory will be the electrical laboratory, in which all measurements to be made away from the machines will be carried on.

The extension on the west side of the second floor will be utilized for an alternating-current laboratory with facilities for two-phase and three-phase work and photometric measurements.

NEW ROLLING STOCK OF THE NORTH SHORE RAILROAD COMPANY OF CALIFORNIA

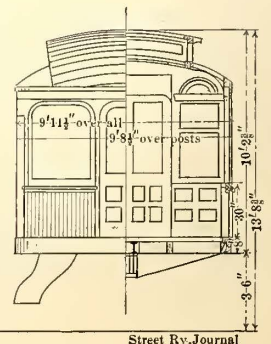
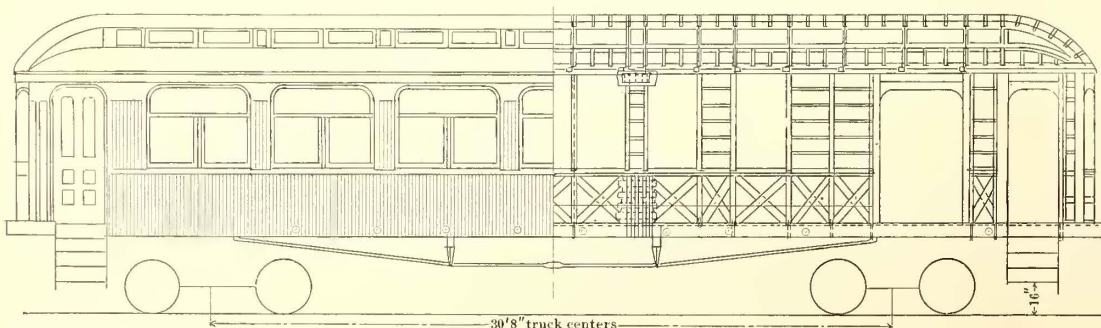
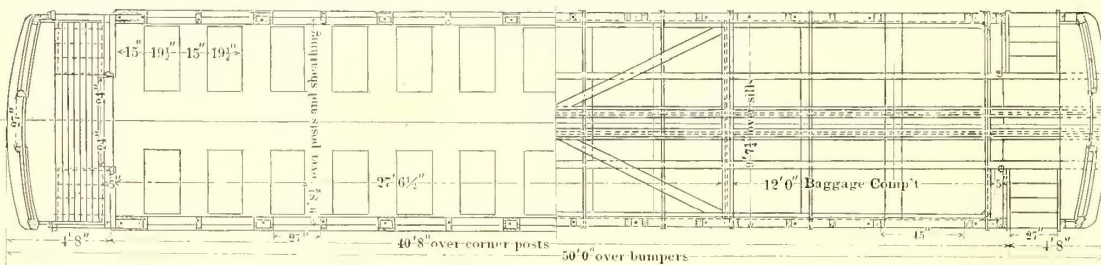
The North Shore Railroad Company of California is changing several miles of steam road to electric traction. This road was formerly the North Pacific Coast Railroad, and has a system which terminates at Sausalito, a point across the bay north of San Francisco, and which is connected with San Francisco by a line of fast steam ferryboats. The rolling stock for this road, to be used when the change to electric traction is accomplished, has been already shipped from the works of the St. Louis Car Company, where both car bodies and trucks were built.

The trail cars, plans of which can be seen in the accompany-



MOTOR CAR, NORTH SHORE RAILROAD

ing line drawings, and of which a photograph is also shown, are very similar to light steam railroad coaches in construction. They are 50 ft. 6 ins. over all, and seat sixty-six passengers. The width over sills is 9 ft. 7 1/4 ins. The platforms, according to the usual steam practice, are 35 ins. long. The seats are 37 ins. long by 18 3/4 ins. wide, with a space of 15 ins. clear between them. The construction is very similar in nearly all details to that used



40-FT. 8-IN. MOTOR CAR, NORTH SHORE RAILROAD

on steam-road suburban cars. The trucks on which these cars are mounted are the standard M. C. B. passenger trucks used on steam roads. These trucks were built by the St. Louis Car Company.

The motor cars on this road are combination baggage and

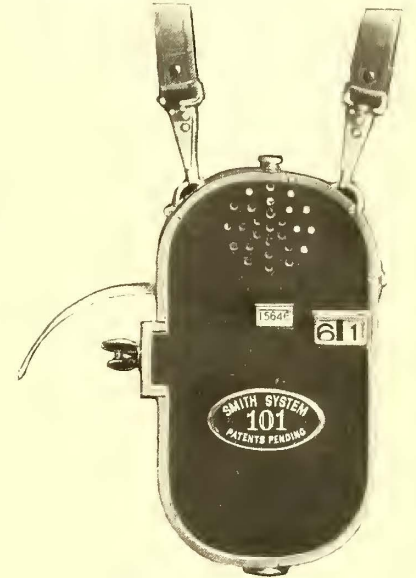
THE SMITH TRANSFER SYSTEM AT KANSAS CITY

A new system of issuing and registering transfers has recently been put in operation on the Thirty-First Street line of the Metropolitan Street Railway Company, in Kansas City,



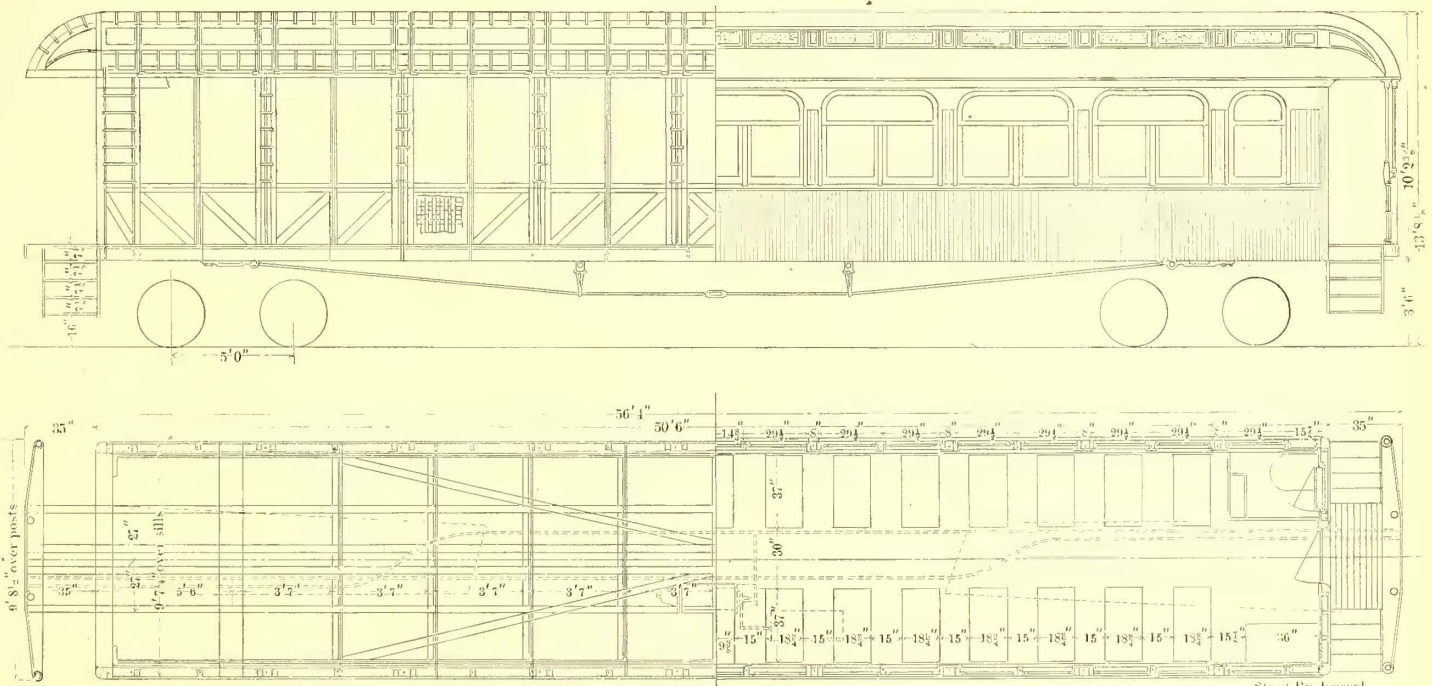
TRAIL CAR, NORTH SHORE RAILROAD

passenger cars. One of these is shown in the accompanying engraving from a photograph as mounted on regular M. C. B. passenger trucks. This was for shipment only, however, as the motor trucks under one end are to be of the Hedley type, also illustrated herewith; but the regular M. C. B. passenger trucks will remain under the end of the car not equipped with motors. This truck is classified as the No. 32 of the St. Louis Car Company, and has been used extensively on the Lake Street and Northwestern elevated roads of Chicago, being designed by Frank Hedley, formerly general superintendent of those roads.



PORTABLE REGISTER

Mo. The system is the invention of W. D. C. Smith, of the Street Railway Supply Company, Kansas City, Kan. In this system the transfers are contained in a roll in a portable register carried by the conductor. This portable register serves both as a register and as a case from which transfers are issued. It is but slightly larger than the ordinary portable fare register. The



50-FT. 6-IN. TRAIL CAR, NORTH SHORE RAILROAD

The Hedley motor trucks are simple in construction, having side frames of one piece of cast steel, to which the end frames of T-iron are riveted. They have a swing bolster similar to the regular M. C. B. bolster.

These motor cars are 50 ft. over the bumpers and 40 ft. 8 ins. over the corner posts. Unlike the trail cars they have vestibules, so that the motorman can shut off the platform he is occupying to form a cab. The baggage department is 12 ft. long.

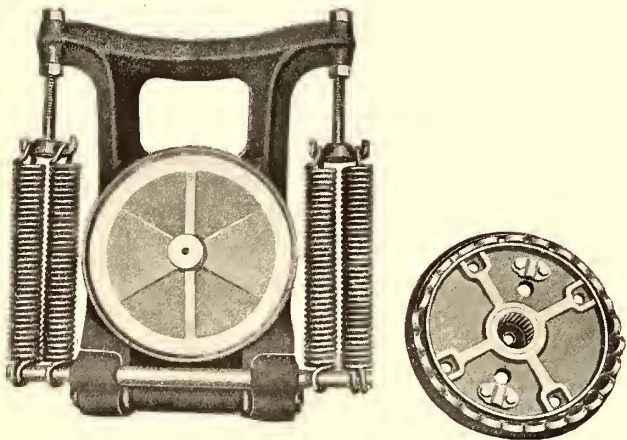
appearance of the register is shown in the accompanying engraving. The transfers are drawn from the case one by one, and no transfer can be withdrawn without registering a fare. Passengers must, therefore, call for transfers at the time of paying fare, and before the fare is registered. As transfers are all registered at the time they are issued the chances for fraud in the issuance and giving away of transfers by conductors are reduced to a minimum, because, as far as the conductor is concerned, it puts a cash value of 5 cents on each transfer he issues.

A large proportion of the people paying fare on the lines of the Metropolitan Street Railway call for transfers, which leaves but a small margin of cash fares without transfers, upon which it would be possible for a conductor to issue transfers for fraudulent use. When a cash fare is to be rung up without issuing a transfer the thumb-screw at the left, seen in the engraving, is turned in one direction, and then returned to its original position. If a transfer is to be issued and fare rung up this thumb-screw is turned in the opposite direction, and then returned to its original position. In the latter case the act of ringing up the fare delivers the transfer within the reach of the conductor so that he can tear it off. The transfer used on the Thirty-First Street line in Kansas City on this system is reproduced here. As these transfers are unrolled and issued by the ringing up of fares, there is automatically stamped upon them the direction in which the car is going, the time within fifteen minutes (the time stamp being, of course, set by the conductor) and the number of the conductor and run. The register is, of course, locked, to prevent manipulation, as is any other register. The total is registered in small figures in the middle of the front case, and the trip numbers are at the right. The conductor can withdraw any number of transfers without registering a fare, but in so withdrawing them they are perforated through the middle and ruined.

W. A. Satterlee, general superintendent, believes that the idea that the issuance of a transfer should be registered by the ringing up of the fare of the passenger receiving the transfer is correct, and hence the new system is being tried. Like any new system, there are, of course, mechanical details to be perfected, but with the working out of these it is believed that the plan will be a success.

LOW TROLLEY BASE

The trolley base illustrated herewith is built by the International Trolley Controller Company, and is similar to the



BOTTOM VIEW OF BASE

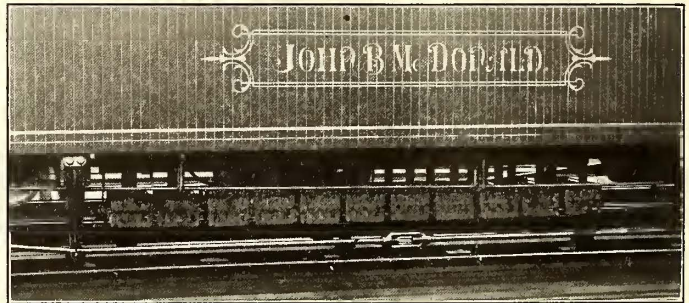
“standard” trolley base of the company, but is only 4 ins. high, so that it will clear practically any low bridge or other overhead obstruction on a line. The leverage also is such that the tension on the wire is uniform in all positions of the pole. Like the standard trolley base, it is of malleable iron, neat in appearance, requires no oil and accumulates no dust.

The strength of the base in the standard trolley base is secured by the use of the dome between the two side frames. In the low base this dome is omitted and instead three cross ribs with reinforcements of metal are employed. The cable connection between the base and the roof cable is entirely under cover and is consequently protected from weather and mechanical abrasion.

NEW WESTINGHOUSE ELECTRIC TRAIN CONTROL AND COUPLERS

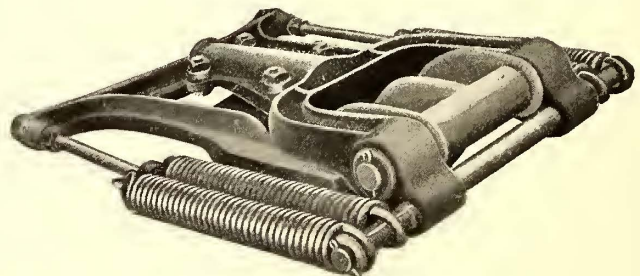
A new system of electropneumatic control for the operation of motors upon the several cars of a train, which the Westinghouse Company has just announced, has been the subject of extended investigation and tests during the last few months, and is now employed under ordinary commercial conditions on the experimental car, John B. McDonald, of the New York Subway Company. The apparatus is a modification of the general design of that supplied by the Westinghouse Company to the Brooklyn Rapid Transit Company for its elevated trains.

The improvement consists in arranging within one compact structure the electropneumatic devices to operate simple forms of electric switches, including a safety circuit breaker, together



NEW ELECTRO-PNEUMATIC CONTROL

with automatic means for preventing the admission of too much current to the motors, thus not only effecting a saving in the amount of current used but also insuring smooth operation of trains. Instead of employing a drum controller, operated electropneumatically as heretofore, the new system comprises a series of switches which are individually operated by electropneumatic appliances similar in character to those employed by the Union Switch & Signal Company in operating its electropneumatic signaling system. The electropneumatic switches are operated progressively, the valves being arranged to admit air to the respective operating cylinders at predetermined periods and at a rate to insure graduated acceleration of the train, at the same time guarding against sudden rushes of current. The organization is such that excessive current cannot be admitted to the motors, and this not only protects the



LOW TROLLEY BASE

motors themselves from undue strains but prevents sudden and abnormal movements in acceleration. The valves may be adjusted so that any required degree of acceleration may be obtained. The details of the apparatus have all been thoroughly worked out and tested in connection with the apparatus of the several Westinghouse companies, and have survived long periods of practical operation. The manufacturers' claim, therefore, that while the present organization of the apparatus in itself is new, it is made up of elements that have been subjected to severe tests in commercial service, thus involving no features of uncertainty as to the practical operation of the new system. The Westinghouse interests have merely availed themselves of the results of the engineering skill and experience of

their several different industries in order to select and apply what, in their judgment, comprised the best features for effecting the operations required in the new system.

The illustrations give a fair idea of the appearance of a car equipped with the new control, and the view of the underside of the car with the apparatus applied shows the space needed. It will be noticed that it is very compact, occupying but a relatively small amount of space, and that it does not in any way interfere with the braking and other apparatus required to be placed on the car.

Provision is made for increased safety in operation, including the arrangement whereby the current is automatically cut off and the brakes applied in the event of an accident to the motor-man. Another important advantage claimed for the new system is in the matter of weight, as it is said to be from one-half to three-quarters of a ton per car lighter than the old style.

An automatic car coupling has also been perfected, by which the electric connections and brake pipes are united by the same operation, and it is contended that this new coupling will add not only to the safety of employees but greatly to the facility and convenience in the operation of electric trains.

IMPROVEMENTS UNDER WAY FOR HANDLING WORLD'S FAIR TRAFFIC BY ST. LOUIS TRANSIT COMPANY

The St. Louis Transit Company is, as would be expected, making extensive additions to its power and rolling stock to take care of the enormous traffic which is expected next year at the Louisiana Purchase Exposition. Nearly all of the World's Fair crowds will have to be handled by the St. Louis Transit Company. In this respect the St. Louis Exposition will be different from the one at Chicago in 1893 and Buffalo in 1901. At both of these former expositions steam railroads were able to furnish a quick means of transportation direct from the heart of the city to the exposition grounds. At St. Louis the steam roads can offer very little in the way of transportation facilities within the city itself. The Union Depot is not within walking distance of the business part of the town, nor are any of the steam railroad lines. Practically the entire traffic will have to be carried by the surface lines of the St. Louis Transit Company. That company realizes the magnitude of the task which will be thrown upon it is shown by the preparations it is making.

An order for 450 double-truck cars has been placed with the St. Louis Car Company with the option of increasing this order to 600. This ranks among the largest orders for additional equipment ever placed by one street railway company at one time. The extent of this addition to the rolling stock can be estimated when it is known that the company's rush-hour schedule at the present time calls for from 850 to 900 cars. The company, of course, has considerable old equipment which can be pressed into service for handling the largest crowds. Within a short time large new shops at Park Avenue and Vandeventer Avenue, near the company's general offices, will be ready for occupancy.

Among other improvements air brakes, worked on a storage reservoir system, will be put on all the St. Louis Transit Company's cars. Compressor plants will be located on every line for supplying air to the cars. In some cases these compressor plants will be put under the street between the tracks.

The company will build in its own shops the trucks to go under the 450 new cars ordered. The regular Dupont swivelled truck is the one adopted. A study has been made of the most economical methods of manufacturing this truck, so they can be turned out very cheaply in quantities. Templets have been made whereby truck frames can be punched so as to be all interchangeable, and, of course, the punching can be done much more rapidly than drilling after the truck frames have been bent. In the new shops and in the new car equipments pro-

vision is made for abandoning pit work in car houses and repair shops as far as possible. Part of the shops will necessarily be equipped with pits because of the company's old equipment, which will not permit of handling everything from above after the trucks are removed from the car bodies. New equipments, however, will all be arranged to be handled from above.

NEW STEAM TURBINE PLANT

The most interest, however, to engineers centers in this company's plans for additional power house equipment. Plans are now being drawn up for a mammoth power house, which will rank along with the large electric power stations of New York city, and those now building at Chicago and at Kansas City. Orders have already been placed with the General Electric Company for Curtis steam turbines with generators. Two of these turbine units will be of 5000-kw and two of 2000-kw capacity. It is expected to have these in operation by the time the exposition opens next year. The location of this power house has not been fully decided upon, but it is more than likely that it will be across the Mississippi River in East St. Louis, as there are a number of reasons why it is desirable to so locate it. In the first place, coal is cheaper on the Illinois side of the river, because of the bridge and switching charges, which are added to the price of the coal brought into St. Louis from the Illinois coal fields across the river. Further than this, land is somewhat more available on the east side of the river than in St. Louis. The plans which are being drawn up for the new power house call for one central turbine room with a boiler house on each side, as this seems to be the most feasible way of getting sufficient boiler capacity to supply each turbine unit, and at the same time preserve the symmetry of the power house so that it can be extended in one direction unit by unit.

The voltage used for generating and transmitting will be 6600, three-phase, which is the voltage of the alternating-current generators now running in this company's northern station. This voltage is within the limits of the present city ordinances relating to high-tension wires, and has been adopted for the new station, not only on account of the present alternating-current apparatus but because it will require no special city legislation. It is but two years since this company built two new power houses for the purpose of shutting down the numerous power houses owned by the various companies previous to the consolidation in St. Louis. Neither of these power houses, however, is of such design as to make feasible and desirable the extension of either one along its present lines. The new power house will be designed on thoroughly modern lines and will be capable of extension to a capacity equal to that of any power house now operating in the United States. Besides the 14,000-kw capacity of Curtis turbine units before mentioned Sterling boilers of 500 hp each have been ordered to the amount of 12,000 hp. Although the two present power houses were expected when built to meet the company's ordinary needs for some time, it has been necessary to start up some of the best of the old power houses which were shut down soon after the consolidation.

Of the two principal power stations now operated the power house at Park Avenue and Vandeventer Avenue, which is the largest of the two, is centrally located, and has a rated capacity of 15,400 kw. This station is entirely direct current, and the main output passes through a recording wattmeter built for 30,000 amps. The main 30,000-amp. bus-bars leading to this instrument are no doubt among the largest railway bus-bars to be found in the country. The other recently built station of this company, known as the Northern Station, has a capacity of 7300 kw, partly in direct and partly in alternating current.

The Moline, East Moline & Watertown Railway Company, of Moline, Ill., reports that it has two large cars in service which have run fully 50,000 miles without any expenditure for repairs.

FINANCIAL INTELLIGENCE

WALL STREET, May 13, 1903.

The Money Market

Conditions remain about the same in the money market as they were a week ago. Rates, if anything, are a little easier, with more disposition on the part of bankers to do business in the longer maturities. For sixty to ninety days $3\frac{3}{4}$ per cent is bid, and a good many loans are being placed at this figure. On six months' contracts $4\frac{1}{2}$ per cent is the official quotation, but as a matter of fact loans of this class are being freely made at $4\frac{1}{4}$. Call money on the Stock Exchange continues to command an average of $2\frac{1}{2}$ per cent.

There are no indications that the market will reach any higher level than this during the immediate future at least. Higher rates would be most likely to result, if they came at all, from exports of gold. But banking opinion is pretty well agreed that these exports will not be carried far enough to affect the local market. The first regular gold engagement of the season was reported on Monday when Lazard Freres announced that it would ship \$1,500,000 to Paris. This transaction was amply foreshadowed by a sharp decline in French exchange at the close of last week, at the same time that our exchange market rose to its highest of the present movement. Two influences have been assisting the recent advance in sterling rates at New York. One of them is the remittance of American subscriptions to the new South African loan brought out last week in London, the other is the accumulation of exchange bills in advance of the payment of the \$40,000,000 due early next autumn to the French company which holds the title to the Panama Canal. Both of these, however, are only temporary influences. The main reason for the current strength of exchange, is that our money market is engaged in liquidating its obligations to European bankers. Before this process is completed we shall doubtless have to send abroad some more gold, but it must not be forgotten that in doing this our market is putting itself in a position where it can draw again upon Europe if necessity arises in the autumn. For the next few weeks gold shipments will be taken care of very easily by incoming currency from the interior. If, in the meantime, the local banks continue to hold their own in operations with the Treasury then cash reserves will not be reduced. The only doubt in regard to the banking position is whether the settlement of foreign credits will not expand loans to such an extent that surplus reserves will be kept from increasing. Last Saturday a further increase of \$9,000,000 was recorded in the loan account, bringing the total increase for the last two weeks up to \$22,000,000, and this result represented very largely the retransfer of floating credits from Europe to this country.

The Stock Market

The stock market of the past week has been a very insignificant affair. Prices, as a general rule, are lower than they were at the last writing, but the decline evidently means nothing more than one of the turns in a narrow professional speculation. Professional operators have had very little real excuse for selling stocks. They have done a good deal of talking about gold exports, about crop damage, about the strikes in the building trade, and on several of the railroads, about the political uncertainties in Manchuria and about the possibility of somebody being badly hurt by the excited rise in the cotton market. But every person of experience realizes that none of these is a matter of really the first importance. Outside conditions, especially the ease in money and the railway prosperity, are unquestionably in favor of higher rather than lower prices. The great trouble with the market is that public interest in stock speculation is dormant, and that the large financial interests are not inclined to bestir themselves to make the market look any more attractive. Dullness and small fluctuations seem about all there is in store so far as the general list is concerned. There are, however, possibilities of a rise in a few individual stocks, which recommend themselves particularly to the investing public, on account of the prospects for an increase in their dividends. We pointed out a week ago several stocks in this category, and they have given a good account of themselves during the past week. Missouri Pacific continues to be bought with the greatest confidence, and has successfully resisted the tendency toward reaction in the rest of the market. The Erie first and second preferred shares have also held remarkably strong, and Illinois Central, in which there is good reason to believe that increased dividends are impending, has moved forward sharply.

Among the local traction stocks the principal feature has been a decline in Metropolitan Securities to the lowest figure recorded since the stock was placed on the market. Apparently some of the selling has come from holders who did not care to pay the second instalment of purchase money which has just been called. But it may also be presumed that bankers behind the enterprise are trying to develop a better market for the stock at a lower level than they were able to do at the higher. Metropolitan shares have acted fairly well, considering the decline in the affiliated issue. Manhattan still shows a steady investment demand whenever the stock is offered at concessions, and the pool in Brooklyn Rapid Transit continues to be master of the speculative situation in that stock.

Chicago

The tangle in the affairs of the Union Traction Company and its affiliated properties has grown worse, if anything, during the past week. Frequent meetings of the North Chicago protective committees have been held without accomplishing anything. Meanwhile liquidation by discouraged holders continues. North Chicago shares sold down as low as 118, and West Chicago to 61. Union Traction common dropped back to 5 and the preferred to 32. It is impossible to see much light in the situation of these properties at the moment. An official of the City Railway is quoted as saying that business is generally satisfactory, and that the recent legislation at Springfield is not disturbing to the company. The stock has kept fairly steady during the week between 205 and 206½. Announcement that a majority of the Lake Street Elevated securities called for under the reorganization plan had been deposited with the committee led to some improvement in Lake Street shares in the market, the price rising from $4\frac{3}{4}$ to $5\frac{1}{2}$. It is still uncertain, however, just how soon the active work of reorganization will be taken up. Metropolitan common sold down a point from $26\frac{1}{4}$ to $25\frac{1}{8}$. Northwestern common was very weak at a decline to 21, and South Side held steady at 106½.

Philadelphia

It has been another dull week in Philadelphia. Prices of the regularly active stocks have changed but little. Philadelphia Rapid Transit continues heavy around 12¼. Union Traction has been dealt in between $46\frac{1}{2}$ and $46\frac{3}{4}$, and Philadelphia Traction between $97\frac{1}{4}$ and $96\frac{1}{2}$. Trading in all these stocks, however, has been too light to be of any significance. Philadelphia Company has sagged off a half point to $44\frac{7}{8}$ on offerings of speculators who bought at the time of the recent publication of the annual earnings statement. Among the specialties the feature has been an advance of about two points in Consolidated Traction of New Jersey. This stock a few weeks ago sold as low as 65; it rose this week to $68\frac{1}{2}$. The reason for the advance is apparently to be found in the recent reorganization among the New Jersey street railway properties, although the advantages of the new arrangement have not yet had time to make themselves clear. Other sales for the week include Rochester Passenger at 71, Indianapolis Street Railway at 83, and Fairmount Park Transportation at 28.

Other Traction Securities

Boston traction specialties have been idle and about stationary during the week. Massachusetts Electric sold up to $32\frac{3}{4}$ and back again to 32, while the preferred, after reaching 88½, dropped on scattering sales to 87. Boston Elevated changed hands between $146\frac{1}{2}$ and 146, and West End common between 91 and 92. Some recovery was reported in the United Railway issues in Baltimore. The common stock rose nearly a point to $13\frac{1}{4}$, and the income bonds a half point from $68\frac{1}{4}$ to $68\frac{3}{4}$. There was no particular news. The general 4s sold between $93\frac{3}{8}$ and $93\frac{1}{2}$, and Knoxville Traction 5s at $101\frac{1}{2}$. Sales on the New York curb during the week comprise: Interborough Rapid Transit (full paid) at $104\frac{3}{4}$ to $105\frac{1}{8}$, the same (90 per cent paid) at $104\frac{1}{2}$ to $104\frac{3}{4}$, New Orleans Railway common at 15 and $14\frac{3}{4}$, the preferred from 40 to $41\frac{1}{2}$, and the $4\frac{1}{2}$ per cent bonds at $81\frac{1}{4}$ and $81\frac{3}{8}$, Brooklyn Rapid Transit 4s at 83, Washington Traction 4s at $77\frac{1}{2}$, St. Louis Transit from $26\frac{3}{4}$ down to $25\frac{3}{4}$, United Railways of St. Louis preferred from $78\frac{3}{4}$ to $78\frac{1}{4}$, American Light & Traction common from $78\frac{1}{2}$ to $77\frac{1}{2}$ and back to 79, and the preferred from 100 to $99\frac{1}{2}$ and back to par.

The announcement that the Superior Court had declared illegal the Cincinnati curative act, mention of which is made elsewhere in this issue, caused a decided slump in the securities of the Cincinnati Street Railway. There was an immediate drop of ten

points and numerous sales were made by those who feared disastrous results. The stock, which had been selling at 141, dropped to 130½, the lowest point recorded. Gradually, however, the fear accompanying the decision gave way to confidence in the present lessees and the stock advanced until at the middle of the week it stood at 136. Since then there have been declines, but recent sales are reported around 134. Sales on the Cincinnati stock exchange during the past week numbered about 1500 shares of this stock and the range was from 133 to 136. Detroit United came in for considerable activity, and in the neighborhood of 500 shares sold at between 82 and 83. The new securities of the Interurban Railway & Terminal Company were offered for the first time, and small blocks of the common sold at 27½. A block of Columbus Railway 5s sold at 110½, a considerable advance over last sales caused by the report of a merger with the Columbus Edison Company. Columbus, Delaware & Marion 5s, and Zanesville Railway & Light 5s were steady at 101. Detroit United and Toledo Railways & Light were practically the only active issues in Cleveland last week. Two lots of the former sold at 82 and 82¾ and 100 shares of the latter were sold at 32½. Small lots of Northern Ohio Traction & Light went at 24, stationary price for several weeks. Lake Shore Electric preferred brought only 50¾, a decline of 1½ from last sales.

Iron and Steel

A further sharp decline has occurred in foundry and Bessemer pig iron prices during the week, and what is more important, because in a measure unexpected, and while reports of a cut in steel prices have been vigorously denied, apprehension is still expressed that prices may soon be shaded in this quarter also. The situation now existing in the iron market is less promising than it has been in a very long time. Buyers and sellers alike are apprehensive of a further decline in prices during the immediate future, and the feeling in the trade is therefore nervous and unsettled. Nothing has happened to seriously undermine the position of the industry, but the widespread labor troubles are a disturbing factor, the importance of which cannot readily be gaged.

Security Quotations

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

	Closing Bid	
	May 5	May 14
American Railways	49	48
Aurora, Elgin & Chicago	a29	a29
Boston Elevated	146	145
Brooklyn Rapid Transit.....	60¼	65½
Chicago City	206½	205
Chicago Union Traction (common)	5½	4½
Chicago Union Traction (preferred).....	32	32
Cleveland Electric	a81	a79
Columbus (common)	85	85½
Columbus (preferred)	104	104
Consolidated Traction of New Jersey.....	67¼	68¼
Consolidated Traction of New Jersey 5s.....	107¾	108
Detroit United	81	79½
Electric People's Traction (Philadelphia) 4s.....	98	99
Elgin, Aurora & Southern	a54	a55
Lake Shore Electric	a15¾	a15
Lake Street Elevated	4¾	5¾
Manhattan Railway	142¼	141½
Massachusetts Electric Cos. (common)	31	31½
Massachusetts Electric Cos. (preferred).....	88	87½
Metropolitan Elevated, Chicago (common).....	26	25
Metropolitan Elevated, Chicago (preferred).....	72	74
Metropolitan Street	134¼	131
New Orleans Railways (common)	14	14¾
New Orleans Railways (preferred).....	39½	40¼
North American	99½	96
Northern Ohio Traction & Light	23¾	23
Northwestern Elevated, Chicago (common)	22	21½
Philadelphia Rapid Transit	12½	12¼
Philadelphia Traction	99½	96¾
St. Louis Transit (common)	28½	26¾
South Side Elevated (Chicago)	105	102
Syracuse Rapid Transit	—	a31
Syracuse Rapid Transit (preferred)	—	a78¼
Third Avenue	120	120
Toledo Railway & Light	30¾	a35
Twin City, Minneapolis (common)	113	112½
United Railways, St. Louis, 4s.....	85	85
United Railways, St. Louis (preferred)	80	78
Union Traction (Philadelphia)	46½	46½

a Asked.

ST. LOUIS TRACTION SECURITIES

A circular sent to stockholders of the St. Louis Transit Company, May 5, announcing officially a meeting to be held on May 23 to vote upon a proposition to issue \$20,000,000 in 5 per cent bonds, had the effect of depressing transit stock and the shares of the United Railways Company on the local stock exchange.

The former stock dropped from \$28.62½, Monday's closing figure, to \$26.50, while the United Railways preferred lost an even point, closing at \$79. There was great surprise at the decline, as nothing new was contained in the circular, and the earnings of the Transit Company during the dedication days fully equaled the company's estimates.

Official figures of the earnings of the Transit Company for the three days, April 30, May 1 and 2, were \$81,369, which was paid by 1,027,380 revenue passengers. On April 30 the receipts were \$32,055, which is the largest single day's receipts in the history of the company.

It was generally believed that the announcement of the proposed bond issue, coupled with the favorable dedication report, would tend to advance the securities. The bond issue is a refunding plan to effect a substantial saving in interest. The opinion prevails that the bears on the stock took advantage of the fact that the circular was not generally understood to lower the market.

In speaking of the proposed bond issue, a director in the Transit Company and United Railways said:

"On March 18 the issue was decided upon and a notice of it published in the press. This notice set forth that it was proposed to make a bond issue of \$20,000,000, and this proposition was to be voted upon at a meeting of the stockholders on May 23. This gave the sixty days' notice required by law.

"May 5, stockholders received a circular signed by Murray Carleton and James Adkins, president and secretary, respectively, of the Transit Company, announcing the meeting, and accompanied by blank proxies. It is presumed this notice was not thoroughly understood by many of the stockholders, as the stock showed a decided weakness.

"Should this issue be authorized there will be only about \$8,000,000 of the bonds issued at once. The proceeds will be devoted to the retirement of outstanding obligations, subject to call, and bearing a higher rate of interest than the new bonds. The remainder will be used to retire underlying obligations as they mature, also to provide payment for betterments and improvements, such as a new power house and new cars, which have been contracted for.

"The earnings of the Transit Company for the days of the dedication, April 30, May 1 and 2, were in excess of \$81,000, as against about \$51,000 for the same period in 1902. These figures give an idea of the increased facilities necessary to handle the traffic during the World's Fair."

THE TROLLEY MERGER IN NEW JERSEY

There were filed at Newark, N. J., last week articles of incorporation of Public Service Corporation of New Jersey, which is to carry out the plan for amalgamating the street railway and lighting companies of Northern New Jersey. The concern is capitalized at \$25,000,000 in shares of \$100 each, while the paid-up capital will be \$100,000. The incorporators are: Thomas N. McCarter, ex-Attorney General, who holds 334 shares; Thomas Dolan, president of the United Gas Improvement Company, of Philadelphia, who holds 333 shares, and John L. Waterbury, of Morristown, who holds 333 shares. Mr. McCarter, who will be president of the new concern, is named as the Newark representative, with offices in the Prudential Life Insurance Company's building. The plan for merging the several companies was given in detail in the STREET RAILWAY JOURNAL for April 18.

ALLIS-CHALMERS COMPANY TO MANUFACTURE NURNBERG ENGINES

Mr. A. Rieppel, the managing director of the Augsburg Nurnberg Manufacturing Company, of Nurnberg, Germany, well known for many years as one of the largest and most successful builders of structural iron work, engines, cars, bridges, etc., in Europe, is now visiting this country for the first time. The latest success of this company has been with gas engines, both for gaseous and liquid fuel. It has long built these engines in smaller units up to 400 hp, operated with petroleum, but for the use of waste gas as well as producer gases, and in larger units, this company has recently developed an entirely new design, constituting the result of many years of experience. The engine, which is of the

double-acting four-cycle type, generally in tandem arrangement, is best adapted for the various purposes of modern power stations.

Mr. Rieppel's visit to this country was made to interest the Allis-Chalmers Company in the manufacture of the products of his company. A contract was entered into by the two companies, giving the Allis-Chalmers Company the exclusive right to manufacture and sell the Nurnberg gas engine for this country and selling rights in any foreign countries, especially the Far East and South Africa.

The Augsburg Nurnberg Manufacturing Company, under the direction of Mr. Rieppel, has made a phenomenal success with this new gas engine, having within the past few months received orders for some 50,000 hp, throughout Germany and Spain, chiefly for generating electric energy. One of these engines is for an important spinning mill in Northern Germany, and will be operated by producer gas.

Mr. Rieppel is now on a tour of inspection throughout this country, after which he will visit the new and extensive works of the Allis-Chalmers Company at West Allis, where these engines will be built.

PROGRESS OF WORK FOR UNION ENGINEERING BUILDING

On the evening of May 7, in accordance with invitation, the boards of direction of the several bodies interested, as well as some other members of the different societies, held an informal meeting at the house of the American Society of Civil Engineers, to consider the gift of \$1,000,000 from Mr. Carnegie for a Union Engineering Building. The meeting organized with the selection of Mr. Noble as chairman and T. C. Martin as secretary.

The president of the American Society of Mechanical Engineers, James Mapes Dodge, reported that at a meeting of their council in the afternoon, the formal resolution proposed in the letter of W. A. Redding, May 1, had been adopted, and a committee appointed comprising Prof. F. R. Hutton, C. Wallace Hunt and himself. The president of the American Institute of Electrical Engineers stated that the board of directors had endorsed the resolution proposed by Mr. Redding, and had appointed a conference committee, comprising Calvin W. Rice, T. C. Martin and himself, with instructions to report back a definite form of resolution which should be adopted. The president and the secretary, Dr. Raymond, of the American Institute of Mining Engineers, stated that their institute would have a board meeting on the following day. The American Society of Civil Engineers will probably have a board meeting within the present week. Representatives of the Engineers' Club expressed hearty accord with the general scheme. Mr. Kafer stated that delegates to the conference would be appointed at the meeting of the officers on May 11. Resolutions were adopted, without a dissenting vote, expressing appreciation and thanks to Mr. Carnegie. It was agreed that the conference committee, consisting of three representatives from each of the five bodies, should be called to determine upon the next steps by the several bodies.

NEW YORK-JERSEY CITY TUNNEL

J. P. White & Company, of New York, have been appointed consulting electrical engineers for the New York & Jersey Railroad Company. Their work will cover the entire electrical equipment of the company's tunnel between New York and Jersey City, and will also include the elevators, ventilation and heating of the terminals. The chief engineer of the tunnel is Charles M. Jacobs, who is chief engineer of the proposed Pennsylvania Railroad Hudson River tunnels, and was in charge of the construction of the East River gas tunnel.

NEW BLOCK SIGNAL SYSTEM

The Pneumatic Signal Company, of New York and Rochester, has purchased from S. Marsh Young, owner of the Young system of automatic electric track circuit block signals for electric railways, all his rights for the United States, Canada and Mexico, and will arrange to place the system at once on the market. In this system the presence of any pair of wheels on the block section, a broken rail or wire, or an open switch will result in a danger signal.

The company will organize an electric railway department, which will be in charge of Mr. Young. It will be remembered that Mr. Young was one of the incorporators and the first vice-president of the Hall Signal Company, and was for some years the vice-president and general manager of the Manhattan General Construction

Company until the latter concern became merged with the Westinghouse interests.

The Pneumatic Signal Company's factory has been until recently at Troy, but it is now moving into new works at Rochester, N. Y. This plant will cover about 240,000 sq. ft. of floor space. The system by which this company is best known is its low pressure pneumatic system for interlocking and block signals on steam railway lines, and is used most extensively in both Europe and America. Its entrance into the street railway field is a new departure, and it is the company's intention to bring all of its experience in the steam railway signal field to bear upon the several problems which are confronting the management of high-speed electric lines.

STREET RAILWAY PATENTS

UNITED STATES PATENTS ISSUED MAY 5, 1903

726,868. Trolley Wheel; Fred B. Corey, Schenectady, N. Y. App. filed Aug. 21, 1902. The wheel is made of sheet metal, the tread being of copper and easily removed from the wheel when worn.

726,869. Trolley Wheel; Fred B. Corey, Schenectady, N. Y. App. filed Aug. 21, 1902. Details of construction of a wheel in which the parts exposed to wear can be readily replaced.

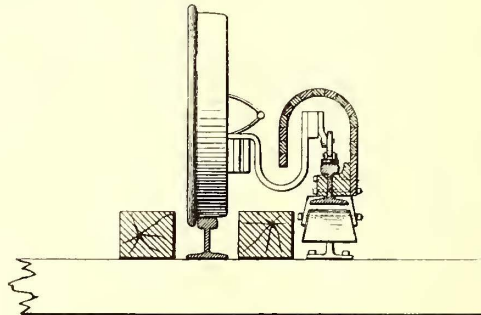
726,917. Trolley Wire Fender; Thomas S. Herrick, Muncie, and John H. Bissett and Franz M. Merrick, Anderson, Ind. App. filed August 23, 1902. Elongated spiral grooves each side of the wheel conduct a displaced wire to the groove in the wheel.

727,017. Roller Side Bearing; Andrew G. Steinbrenner, St. Louis, Mo. App. filed Dec. 16, 1902. Consists of a base plate, a cap plate, wear plates connected to said plates, and a bearing frame interlocking with the wear plates, the frame being movable thereon.

727,021. Trolley; William S. Stockton, Philadelphia, Pa. App. filed March 13. Comprises a yoke which is pivoted upon the trolley pole, below the usual harp, the upper ends of the yoke diverging from a point adjacent to the rim of the trolley wheel and serving to deflect the wire into the wheel.

727,064. Circuit Closer; Walter J. Bell, Los Angeles, Cal. App. filed Jan. 2, 1903. A trolley wire attachment by which current delivered therefrom to switch-operating magnets in the track can be controlled from the car.

727,068. Collector for Electric Tram Roads or Railroads; Andre Bolzano, Munich, Germany. App. filed Dec. 23, 1902. A mixture of vaseline and glycerine is placed in the slot containing the conductor.



PATENT NO. 727,227

727,147. Automatic Operating Mechanism for Electric Railway Switches; Gray W. Johnson, New York, N. Y. App. filed July 16, 1902. A peculiarly constructed circuit changer is thrown by a magnet energized by the car, to energize one or the other of two magnets acting upon the switch point.

727,217. Brake Beam; Louis A. Shepard, Brooklyn, N. Y. App. filed Sept. 9, 1902. The beam is constructed of rolled metal whose section is the shape of a cross, one of the arms of the cross being of sufficient depth to form a web or flange and terminating in a bulb-like enlargement.

727,218. Brake Beam; Louis A. Shepard, Brooklyn, N. Y. App. filed Sept. 9, 1902. A trussed brake beam consisting of a compression member having integral hollow ends, a tension member and a strut, the ends of the compression member being parallel to the ends of the tension member, the ends of the tension member being sleeved therein and held under tension thereby.

727,219. Brake Beam; Louis A. Shepard, Brooklyn, N. Y. App. filed Sept. 9, 1902. Comprises a tubular compression member, a trough-like tension member and a strut, the ends of said compression member being parallel to the ends of the tension member and being sleeved therein.

727,233. Switch; John Smith, Tacoma, Wash. App. filed Jan. 19, 1903. A throwing lever pivoted to the forward end of the

tongue and adapted to be engaged by an operating bar carried by the car so that when the bar engages the lever the fulcrum is at the point thereof until the lever is thrown into contact with a lug secured to the switch and then the lug forms the fulcrum thereof for the complete throwing of the lever and tongue.

727,224. Brake-Shoe; William E. Steinharter, Allegheny, Pa. App. filed Aug. 23, 1902. A brake-shoe so shaped as to be adapted to engage both the tread and flange of the wheel.

727,227. Electric Railway; Clendinen A. Thompson, New York, N. Y. App. filed Feb. 4, 1903. The third rail is provided with a hood fastened to the web of the rail, thus making it possible to apply the invention to existing systems.

727,290. Car Fender; John P. Clark, Terre Haute, Ind. App. filed Dec. 12, 1902. Details of construction.

727,478. Electric Switch; John L. Steeb, Butler, Pa. App. filed Aug. 30, 1902. Details of a switch operated from the car by electromagnets.

PERSONAL MENTION

MR. GEORGE M. COLE has resigned as manager of the Plattsburgh Traction Company, Plattsburgh, N. Y. His successor is Mr. Albert E. Reynolds of the same company.

MR. BLAKE A. MAPLEDORAM has resigned his position as general manager of the Moline, East Moline & Watertown Railway Company, of Moline, Ill., with which company he has been connected for over one year. Mr. Mapledoram will leave for the East to take up larger work.

MR. ALBERT EASTMAN has resigned as general superintendent of the express system of the Utica & Mohawk Valley Street Railway Company, of Utica, N. Y., to become connected with the Detroit United Railway, with which company he was connected before becoming associated with the Utica Company.

MR. H. P. McINTOSH has resigned as vice-president of the Lake Shore Electric Railway, Cleveland, Ohio, and as member of the executive committee. He still retains his place on the board of directors. Mr. J. R. Nutt has been elected to fill the positions vacated by Mr. McIntosh.

MR. C. C. REYNOLDS, formerly of Indianapolis, Ind., has been made general manager of the Indianapolis & Northwestern Electric Railroad, Frankfort, Ind., and will assume his duties about June 1. He has lately been identified with the McKinley syndicate, but before that was connected with the Chicago & Erie at Huntington, Ind., and later at Chicago.

MR. RICHARD EMORY has resigned as secretary of the Dayton, Springfield & Urbana Railway Company, of Dayton, Ohio, and has been succeeded by Mr. A. Pomerene. Mr. Emory continues as general manager of the property, as well as of other Appleyard interests in Ohio. Mr. William T. Mitchell, of Boston, has resigned as treasurer of the company, and Mr. Charles Appleton has been elected to fill the vacancy.

MR. R. A. HADFIELD, managing director of Hadfield's Steel Foundry Company, Ltd., of Sheffield, England, is making a short visit to this country. This company is one of the largest of the steel companies in Sheffield, and has taken a leading part in the development in Great Britain of special work, particularly manganese steel and cast-steel special work for electric railway work. The company has also been contractor for a large part of the steel work for the new underground conduit lines of the London County Council.

MR. JOSEPH A. MCGOWAN, of Portland, Me., has been appointed to an important confidential position with Mr. Hugh J. McGowan, of whom he is a brother, in the management of the Indianapolis Traction & Terminal Company, of Indianapolis, Ind. Mr. McGowan is a native of Portland, and has been connected in very responsible capacities with the Grand Trunk Railway in that city for the past twenty-five years. He has filled various important positions in connection with the city government of Portland and served in both branches of the City Council, and for many years was a member of the School Board. He has also been a director in several local corporations, and a prominent and leading figure in club and social circles in Portland.

MR. A. W. MARTIN, secretary to General Manager Chamberlain, of the New York, New Haven & Hartford Railroad, has tendered his resignation, to accept the position of general manager of the Worcester & Connecticut Eastern Railway Company. Mr. Martin has been in the railroad business nearly 35 years. He entered the service of the Boston, Hartford & Erie Railroad in July, 1867, as freight clerk at the Southbridge station, and Sept. 1, 1880, was placed in charge. May 1, 1887, he went to New Haven as chief clerk to the superintendent of the Shore line division. Sept. 1, 1890, he was appointed general agent of the New York & New

England Railroad at Fishkill, and Newburg Dec. 1, 1891, he was transferred back to Southbridge. In the fall of 1892 he was elected to the Massachusetts Legislature, where he served on the committee on railroads. In June, 1893, he entered the service of the New Haven road as chief clerk to the general superintendent of the Old Colony system. July 1, 1896, he was made secretary to the general manager.

MR. JOHN HARRIS, the retiring superintendent of the Cincinnati Traction Company, of Cincinnati, Ohio, was tendered a farewell reception on May 2 by the employees of the company. The programme was arranged by the Street Railway Employees' Protective Association, and the reception was held in the Young Men's Christian Association Building. Mr. Harris was lured down town on the pretense of going to the theater, and was not aware of anything regarding the demonstration until he saw the parade of employees as it was nearing its destination. The president of the employees' association acted as master of ceremonies, and made a speech in which he told of Mr. Harris's kindness to the men, despite the severe discipline that he exacted during his career as superintendent. He then went on to give a brief outline of what Mr. Harris had accomplished, and told of the high esteem in which he is held by all who come in contact with him. Mr. Harris was then presented with a beautiful music-box and a dress-suit case, containing a toilet outfit trimmed in solid silver. There was also presented a huge bouquet of American Beauty roses. Then several other speeches were made, among them being one by Mr. R. E. Lee, who succeeds Mr. Harris. The Cincinnati "Post," in an editorial, entitled "Where Effort Was Worth While," pays a glowing tribute to Mr. Harris. Holding up his career as one to be emulated by the young men of the present generation, the "Post" concludes by saying: "Hundreds of friends surrounded John Harris on May 2. There were presents and speeches and hearty handshakes and good wishes. One man had so lived that hundreds deemed it an honor to take his hand and are proud of his friendship."

MR. DAVID YOUNG, general manager of the North Jersey Street Railway Company, which is to be merged with other street railway companies in Northern New Jersey into the Public Service Corporation, of New Jersey, has resigned from the company and will accept a position as expert street railway adviser with Brown Brothers & Co., bankers, of 59 Wall Street.

Mr. Young is a man of strong traits of character and pronounced individuality. Born at Alloa, Scotland, May 6, 1849, he entered on a business career after receiving a public school education that extended only partly through the high school. He has spent just half of his life in this country, and all of it as a resident of Newark. After leaving school, Mr. Young engaged in civil engineering, and from 1868 to 1884 was a partner in the firm of Thompson & Young, of Newark, and from 1885 to 1891 he was associated in the same business with Mr. Harrison Van Duyne. Mr. Young has also been prominent in New Jersey politics. At twenty-six years of age he was elected to the Common Council of Newark, and at twenty-eight, at the commencement of his second term, he was elected president of that Council. He served a number of terms in the Common Council, and has also been a member of the General Assembly of the State Legislature. These offices are all that have been held by Mr. Young in a political way.

When the plan for the consolidation of the electric railway systems in Jersey City and Newark, by the Consolidated Traction Company of New Jersey, was taken up in June, 1893, Mr. Young was selected as general manager of the company. The company was one of the first interurban railways in the country, and has gradually absorbed the lines in Elizabeth, Orange, Montclair, Paterson, Rutherford and Hoboken, so that the problems Mr. Young has been obliged to solve have been varied and many, while the system which he has been called upon to manage has grown to be one of the largest in the country. Under his direction large shops and a large power station have been built at Newark, while plans are under way and nearly completed for a complete polyphase distribution system from one central station.



DAVID YOUNG.

NEWS OF THE WEEK

CONSTRUCTION NOTES

BIRMINGHAM, ALA.—The Birmingham Railway, Light & Power Company has completed its new line to Bessemer. The road is 12 miles long, and, with another line soon to be completed, will make a 25-mile loop line between Bessemer and Birmingham.

SALEM, ARK.—Surveys are now being made by the Salem & Eastern Railroad Company, incorporated last year, for an electric railway to connect Salem, Afton, Fayetteville, Poplar and Bluff. R. A. Youngblood, of Salem, is interested.

LOS ANGELES, CAL.—Articles of incorporation have just been filed in Bakersfield by the Bakersfield & Ventura Railway Company to construct 125 miles of road. The principal offices of the company are in Los Angeles. The incorporators are: H. M. Russell, Eben Smith, J. W. Burson, Gervais Purcell, A. N. Sanford and J. W. Swanwick. These, with the exception of the first-named, constitute the board of directors for the first year. J. W. Burson is treasurer, and the capital stock is \$5,000,000, of which amount \$360,000 has been subscribed. All the parties named are residents of Los Angeles. Although the articles authorize the use of steam, electricity or cable as a motive power, electricity will be used and supplied for all purposes.

LOS ANGELES, CAL.—The Los Angeles & Redondo Railway Company has begun the work of equipping with electricity its line between this city and the seashore. The company already has one electric line to Redondo.

LOS ANGELES, CAL.—The Los Angeles & Glendale Electric Railway Company was incorporated on May 5, with a capital stock of \$1,000,000, of which amount \$25,000 has been subscribed. The incorporators and directors are: L. C. Brand, R. H. Howell, E. T. Stimson, W. H. Holliday and George F. Cope. The primary purpose of the incorporation is to build an electric railway from Los Angeles to Glendale, a distance of 10 miles. Eventually this road will be extended to Burbank, with intermediate branches to Pasadena and Griffith Park. The aggregate length of the proposed line is 25 miles. The right of way for the line to Glendale has been obtained, and Mr. Brand has put up \$10,000 in forfeiture provided the road is not completed within six months.

LOS ANGELES, CAL.—Henry E. Huntington has purchased, for about \$200,000, the beach interests of the West Coast Land & Water Company in Pacific City, Orange County, about 5 miles south of Newport. The property comprises about 2000 acres off the seashore, together with a substantial wharf, water plant and pavilion. This purchase involves an extension to Pacific City of Huntington's proposed electric route from Los Angeles to Santa Ana.

MONTREAL, CAL.—The franchise of the Montreal Street Railway Company in Westmont has been extended eleven years, making the life of the grant 30 years, in consideration of an extension of its system.

SAN JOSE, CAL.—Articles of incorporation of the San Jose, Los Gatos & Saratoga Interurban Railway Company, recently organized and for which the contract for construction has been awarded, have been filed here for record, with a capital stock of \$3,000,000, with \$25,000 paid up. The directors are: J. W. Rea, F. S. Grange, Thomas Rea, E. M. Rea, Louis Loupe and George W. Waldorf.

SAN JOSE, CAL.—It is said that the San Jose Street Railroad is to be extended to Campbell.

SAN JOSE, CAL.—The City Council has passed ordinances granting franchises on Market Street to the San Jose & Santa Clara Railroad Company and F. S. Granger.

DENVER, COL.—The Denver & Northwestern Railroad, which controls the Denver tramway, has applied for a franchise to construct a loop in Golden. In asking for the franchise the company states that it proposes to operate an electric railway between Denver and Golden and to maintain hourly service. Construction on the line will begin as soon as the right of way is decided upon. It is also stated on good authority that the owners of the tramway are again negotiating with the receiver of the Denver, Lakewood & Golden road looking to the purchase of that line.

DANBURY, CONN.—The stockholders of the Danbury & Harlem Traction Company, which is constructing an inter-State line between Danbury and Golden's Bridge, N. Y., have voted to ratify the action of the directors in favor of an increase of the capitalization and of the bond issue. It is believed that all obstructions to the resumption of work on the road have now been removed, and it is now stated that it will be resumed in about two weeks, and that the road will be pushed to an early completion. The line will be about 17 miles long.

ENFIELD, CONN.—The Somers & Enfield Electric Railroad has been placed in operation between Thompsonville and Somers. The line is operated in close alliance with the Hartford & Springfield Street Railway Company.

HARTFORD, CONN.—The Bristol & Plainville Tramway Company has let the contract to grade the roadbed to P. H. Condon & Company, of Hartford. The contract to construct about 2500 yds. of cemented masonry in the gorge has been let to Holbrook, Cabot & Rollings, of Boston. The wall will be built of solid cemented masonry, will be 60 ft. high in places and 17 ft. wide at the base. The hill alongside the gorge will be reduced from a 10 per cent grade to one of 5 per cent. All this work will be done at the company's expense. The company expects to have this line in operation by Labor Day.

HARTFORD, CONN.—The Legislature has refused to grant a charter to the Norwich & Middletown Street Railway Company, and has also refused to grant a charter for the construction of the proposed electric railway from New Haven to Wallingford.

NEW HAVEN, CONN.—The Fair Haven & Westville Railroad has practically completed the rebuilding and double-tracking of the Woodmount branch of its system. The road has been straightened, many of the grades have been reduced and most of the highway grade crossings have been eliminated. The improvement has involved an expenditure of approximately \$75,000.

NORWICH, CONN.—Preliminary surveys for the electric railway which has just been chartered to run between Norwich and Westerly, R. I., have been begun. The road, which will be built by the Norwich, Mystic & Westerly Street Railway Company, will run through the towns of Norwich, Preston, Ledyard, Stonington and North Stonington. The capital stock of the company is \$800,000, and large authority to make traffic agreements with electric railway companies in Connecticut and Rhode Island and to merge with other street railway corporations is conferred by the charter. The incorporators are: State Treasurer Henry H. Gallup, Costello Lippitt, William B. Young, Reuben S. Bartlett, Aaron Lucas and Edwin H. Knowles.

WASHINGTON, D. C.—The Chesapeake Beach Railway Company has under consideration the subject of converting its line into an electric railway, but as yet nothing has been determined definitely, and probably will not be for four or five months. For the present, at least, the company intends to operate the road under steam.

COEUR D'ALENE, IDAHO.—The Coeur d'Alene & Spokane Railway Company, which was organized in October, 1902, with a capital stock of \$500,000, is to construct a 34-mile electric railway between Coeur d'Alene and Spokane, Wash. The rolling stock will consist of eight motor cars and six trail cars. Power will be brought from a local water-power company. The officers of the company are: F. A. Blackwell, president; A. Betts, vice-president, general manager and purchasing agent; William Dollar, treasurer; C. P. Lindsley, secretary; J. C. White, engineer.

ALTON, ILL.—President J. F. Porter, of the Alton Railway, Gas & Electric Company, has returned from New York City, where he was in conference with financiers in regard to the proposed merger of the electric lines of Alton and the Tri-Cities, which would form a nucleus for the proposed Alton-St. Louis Electric Railway. President Porter says that he did not have anything definite to give out, but that it was expected some plan would be determined upon within the next few days whereby the proposed road would become an assured fact.

CHICAGO, ILL.—It is understood that the Northwestern Elevated Railroad Company has prepared its extension ordinance, and that the same, asking right to build the line to Ravenswood, will be presented to the City Council very soon. It is said the company will issue \$1,000,000 treasury bonds to cover cost of the work.

CHICAGO, ILL.—The Lake Street Elevated Railroad is about to begin the construction of a transformer station at Lombard Avenue and Lake Street. The building will be three stories high, 40 ft. x 1000 ft., and will be constructed of pressed brick and stone. The estimated cost of the building and equipment is \$75,000.

HARRISBURG, ILL.—An electric railway is projected to extend to Cartersville, where a connection will be made with the coal belt electric railway, which traverses the Williamson County coal fields. E. Sponseler, of Harrisburg, is interested in the project.

METROPOLIS, ILL.—Capitalists in Paducah, Ky., and Cairo, Ill., and in the intermediate country are taking steps to organize a company for the purpose of building an electric railway between Paducah and Cairo, through the Kentucky territory opposite here. The distance is about 25 miles.

MILAN, ILL.—The Western Illinois Railway Company has completed the field work of the survey of its line from Alledo to Moline and finds a natural grade almost all the entire distance of 47½ miles. The road will connect touching Millersburg, Buffalo, Prairie, Illinois City, Edginton and Andalusia, which have no railway connections, and will pass through as fine a farming and stock country as there is in the State.

WINCHESTER, ILL.—The City Council has granted a franchise to the Jacksonville Traction Company, which will build an electric railway between Winchester and Jacksonville. The line must be in operation by January, 1905, or the charter will be forfeited.

EVANSVILLE, IND.—The Board of Works has granted to the Evansville & Henderson and the Evansville & Booneville Interurban Railways a franchise to enter the city over a joint or union track, with a double trolley, each company operating its own cars by its own power.

FT. WAYNE, IND.—The Ft. Wayne & Goshen Electric Railway Company has filed an application for a franchise to enter the city over the Ft. Wayne Traction Company's lines. An agreement as to route and terms has been reached by the two companies.

JEFFERSONVILLE, IND.—Victor W. Lyon, city engineer, is making a survey from New Albany to Corydon for a proposed electric railway. The line will be 20½ miles long.

INDIANAPOLIS, IND.—The Union Traction Company has been granted franchises at Winamac and North Judson for its line from Logansport to Hammond, which will connect with the Lake system at Hammond and the Indianapolis & Northern at Logansport, thus connecting Indianapolis and Chicago by electric railway.

INDIANAPOLIS, IND.—The Ft. Wayne & Northeastern Traction Company, of Ft. Wayne, has been incorporated with \$100,000 capital stock. The company will build an electric railway from Ft. Wayne to Hicksville and Bryan, Ohio. The directors are C. S. Karoly, R. S. Robertson, W. S. O'Rourke, G. W. McKee and James H. Haberly.