

tion should not be diverted for a moment from their duties. There should be no possibility of physical interference with them by passengers crowding the front platform so as to prevent their unrestricted movement in controlling the car. It is often difficult to enforce this rule, and in many cases it has been found necessary to use gates on the front platform to keep passengers off. This is done on the open cars of the Interurban Company in New York and in many other large cities where the danger is recognized, but on the closed cars it is often difficult to keep this platform entirely clear, as the front as well as the back door is used by passengers entering and leaving the car. It would seem as if the passengers themselves, for whose protection the rule was made, would co-operate with the management, but it is a matter of common knowledge that even when there is plenty of room inside the car many persons persist in standing on the front platform until they are compelled by the conductor to enter under penalty of ejection. In the Newark case the company had established a rule of this kind for the purpose of preventing the crowding of the platform, and it proved a valuable defense for the indicted officials.

An Almost Untouched Field

There are few functions of the railway in general that have not been assumed by the electric car, and yet so busy have we Americans been in the ordinary line of street railway work, varied by interurban excursions, that we have been, and are, prone to overlook side issues, even if interesting and profitable ones. Hence it has come about that the portable, or semi-portable tramway, has been left quite exclusively to the steam engine builder, in spite of the singular adaptability of the trolley system to this class of work. It is largely an export business at present, which may account for our lack of interest in it, but its extent is really far more than the average person realizes. We, in this country, are generally remiss in looking after export business, except along certain conventional lines, and as a people our business methods are such as repel rather than attract trade with countries other than European. In particular, the American makes the effort to sell his regular standard line irrespective of the customer's demand, and makes that line following a system of weights and measures unfamiliar save in English-speaking countries. Nevertheless, in the way of portable light railways there is good business to be had, which ought to be developed along electrical lines, and practically nothing has yet been done about it. All through tropical America there is a demand for light tramways that can be easily and cheaply installed and operated. For such work the electric motor, worked from a semi-portable generating station, possesses especial advantages. It is about as nearly fool-proof as a machine can ever be, highly efficient, remarkably free from danger of breakdowns, and exceedingly convenient in every way. Yet it has been hardly even given a trial in light tramway work.

The engineer dealing with this particular problem may seek and seek in vain for suitable electrical equipment among American makers. He can find, indeed, railway motors, not of the latest design, which will go upon, by close fitting, trucks of a meter gage, and special running equipment at high prices for trucks somewhat narrower, but nothing that would come anywhere near filling the bill, for, by way of example, a plantation railroad of 6-10-m gage ($23\frac{5}{8}$ ins.), a common standard for light work. Nor can he find any more easily the equipment of such a road outside of the motors.

The time has come when American manufacturers must look to export business more and more. Our facilities are un-

equalled, the world's trade is ours if we will but go out and gather it in. But there is need of a wider view and more flexible methods to work foreign trade for what it is worth, and this instance in tramway manufactures is typical of many others. American engineers are prowling all over the world, and will bring trade home whenever they can, but they must be met half way by the manufacturer. In some instances the manufacturer has done his duty, and American electrical machinery is in use pretty nearly all over the world, but the particular corner of tramway work which we are considering seems to have been passed by and left for others to exploit.

Stopping at Far or Near Side of Street Crossings

In the discussion on rules at Saratoga Mr. Beggs called attention to the provision in rule 24 relating to points at which cars stop on signal, and he questioned the advisability of assuming that street railways generally would continue to stop on the "far side" of the street. He mentioned the fact that some municipalities had enacted ordinances requiring street cars to stop on the "near side" of the street, and that others were seriously contemplating similar action. Cincinnati was prominent as one of the latter class, and other cities might have been added to the list, especially those on the Pacific Coast, where, we understand, the subject is receiving a good deal of attention at present. In Los Angeles, for instance, the local street railway men are securing an expression of opinion from other companies, especially those in that section of the country, as it is recognized that any rule made for governing the operation of cars should be made general for the part of the country at least in which it is introduced. This is partly because the American public travels so much that every city has at all times a large percentage of visitors, and these strangers patronize the street cars freely. Moreover, there is a constant shifting of population, and confusion would result if regulations of this kind were not made universal. This explanation has been offered for the failure of the plan where it has been attempted heretofore. In the great majority of cities cars stop on the far side of the street only, except in the case of intersecting streets upon which there are car lines, and there the cars are obliged to stop on the near side, and then if there are passengers to be taken on at the far side another stop is necessary. Mr. Beggs referred to this feature of the case in the discussion before the American Street Railway Association, and pointed out the advantage of having a universal rule by which cars would stop at the near side only. This would do away with the double stop, a point that has been emphasized by advocates of the proposed measure. Probably the strongest argument in favor of the proposed rule is that a car in starting up is under better control than in slowing down, especially on slippery tracks or where there is a down grade; the danger at street crossings is thus minimized when the stop is made at the near side.

There are a great many influential street railway managers who favor the proposed change, and some of them, including Mr. Beggs, of Milwaukee, Mr. Beeler, of Denver, and other practical men, are earnestly advocating its general adoption, and they would welcome the enactment of ordinances embodying this rule. The subject has been a topic of discussion in different parts of the country for several years, and in some places where it has been tried it has been found difficult to get the people to depart from their established custom. That seems to be the greatest, although not the only, trouble, and we venture to say that it will remain a serious obstacle to the general adoption of the rule.

Report of the Merchants' Association

The Merchants' Association of New York has published a report by its "committee on engineering and sanitation" upon the "Passenger Transportation Service in the City of New York," embodying the results of the investigation which was made by the committee at the time of the hearing before the State Railroad Commissioners. The findings and recommendations correspond with those advocated in the preliminary report, published on page 183 of our issue of Jan. 31, and the report in question is an elaboration and defense of this preliminary statement.

The preface to the document is signed by William F. King, chairman of the committee on franchises and transportation, and we are sorry to see that it partakes of those acrimonious characteristics which pervaded his utterances during the agitation last winter. While Mr. King advocates co-operation between the city, the companies and the patrons of the railways, his attitude makes it clear that harmonious action can only be obtained by accepting his views unreservedly. A perusal of his introductory message cannot fail to prepare the reader for what follows. With charming frankness Mr. King declares that the work of his organization, as presented in this document, embodies the only reliable and trustworthy data on the subject, and that "all official reports have rested upon data supplied by the railway companies, and, therefore, from an interested source."

To the average business man it would seem that the State Railroad Commission, which has access to the records of the railway companies, is in much better position to present an accurate, comprehensive and reliable statement of facts than any unofficial committee, no matter what its character or composition. Yet, Mr. King places his personal opinion and that of the committee above the records of the railway companies, even those which have been compiled on such important subjects as the obstructions to the movement of surface cars in Manhattan.

Commenting upon the contention of the Interurban Company, for instance, that it is impossible under existing conditions to move more cars or attain higher speed on congested streets, the committee admits that it "is not prepared to deny this statement unreservedly;" in other words, "the only comprehensive and reliable data thus far gathered" does not disprove the assertion of the railway company, but the committee will not graciously admit its accuracy. It refers in another place to a statement of the same company as "plausible and difficult to disprove," thus indicating that the principal object of the investigation was to discredit the records of the railway companies, as well as, incidentally, the official reports of the Railroad Commissioners themselves.

This of itself would be enough to disqualify the committee, but the report elsewhere shows a lack of practical knowledge which should be possessed by any body of "experts" assuming to regulate traffic in New York. Thus a considerable portion of the report is given to a discussion of the subject of double-deck cars. If there was any value in double-deck cars for American conditions, certainly some one company in this country would have adopted them as a result of the trials to which they have been subjected in this country. But although this subject has been threshed out repeatedly by transportation companies from Maine to California, the committee clings to the hope that some plan may be found to permit of their introduction in this city. The report reluctantly admits that conditions do not seem to favor their operation in New York, but recom-

mends, nevertheless, that a fair trial be given this type of cars.

Another important point upon which the conclusions in the report differ radically from those of practical railway men is in the division of responsibility for the operation of cars. The committee sees no theoretical reason why this cannot be done, and recommends the employment of two conductors on all closed cars, 28 ft. in length and over, so that when fares are being collected in the body of the car there may be a man on the rear platform to give the signal to start and stop the car. We so fully considered this proposition in an editorial in our issue of Jan. 31 that we shall not again discuss it here. It is sufficient to say that this proposition will always be opposed by practical railway men, on the ground that it would result in a division of responsibility, confusion and friction, which would prove detrimental to the service.

Generally speaking, it may be said that the report presents little information of practical value, and that it is made up principally of expressions of opinion on the recommendations already discussed. Much disappointment was felt by the Merchants' Association because of the failure of its bill providing for the appointment of Railroad Commissioners representing the city of New York, but the explanation may be found in the report itself. The association's representatives found it "difficult to disprove" the assertion that the railway companies and the present commission were fully competent to handle the situation.

Responsibility of Directors

What is the measure of responsibility of a director of a corporation, so far as accidents are concerned? This question came up for consideration in Newark upon the trial of the directors of the North Jersey Street Railway Company, under the indictment returned by the Essex County Grand Jury, as a result of the investigation into the grade crossing tragedy of last February. That the management of a railway company is accountable in civil actions for injuries resulting from the negligence of the company's servants, and insufficiency of its equipment or other remediable fault is well understood and established, but to charge the directors with criminal responsibility was a new proceeding, and, as the case developed, was shown to be wholly unwarranted and indefensible. For all practical purposes the men charged with manslaughter had no more to do with the fatalities than any other half a dozen men holding the securities of the company. The charge against them was something new in law and criminal procedure, and it is scarcely necessary to point out that if it had been possible to find them guilty of manslaughter for an event that happened many miles away from them and without their knowledge, and by reason of an infraction of the rules made by the practical managers hired by the directors, it would have been difficult to ever again secure the services of financiers to manage the business of trolley companies or of any industrial company whose operations might involve casualties through inadvertence of employees. It was contended on behalf of the indicted officials, and the position was sustained by the court, that the officers under trial had not neglected their plain duty in a felonious manner, and that they had not shown an evil disregard of duty, or a reckless disregard of the lives of passengers. It is a matter of much importance that the decision in this case was reached without a dissenting opinion. Chief Justice Gummere had invited Justices Dixon and Van Syckle to sit with him, and they concurred in his decision directing the jury to return a verdict of acquittal.

SHOPS OF THE AURORA, ELGIN & CHICAGO RAILWAY

The shops of the Aurora, Elgin & Chicago Railway, at Wheaton, Ill., are regarded as model equipments for interur-

traveling crane of this kind is unusual in such a small shop, but it greatly facilitates repairs. The rolling stock of the company is very heavy, and, consequently, repair work would be very slow were it not for this traveling crane, as the motor

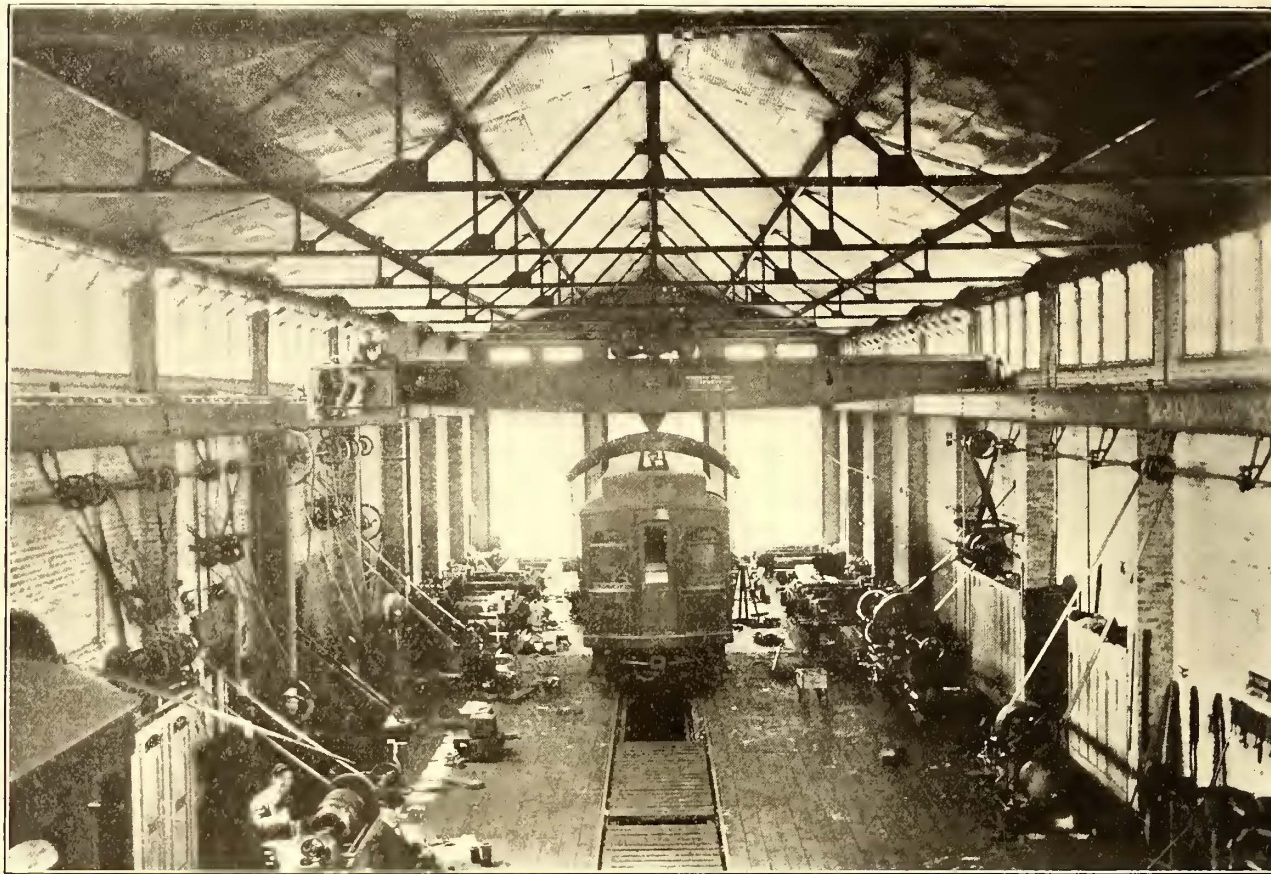


FIG. 1. GENERAL VIEW OF SHOPS, SHOWING CRANE READY FOR RAISING CARS

ban electric railways. They are notable for the completeness of their organization and a number of features which greatly facilitate repairs rather than for their size, as the road is not large. The equipment comprises thirty cars, only a small number of which are required for the ordinary schedule.

Fig. 1 shows a general view of the repair shop, and Fig. 2 the ground plan of the repair shop and adjoining parts of the buildings. The repair shop is spanned by a crane of 10 tons capacity, furnished by the Whiting Foundry Equipment Company. This travels the entire length of the repair shop. A

cars are each equipped with four 125-hp General Electric motors.

Next after the traveling crane the feature which will attract visitors' attention is the arrangement of the tracks and pits. One track runs directly through the repair shop from end to end, as seen in Fig. 2. This track makes it possible to enter the shop at either end, from the yards at the east of the building or from those west of the building. At each end of the building there are two tracks in addition to the middle track. These tracks hold one car each and have pits. The space

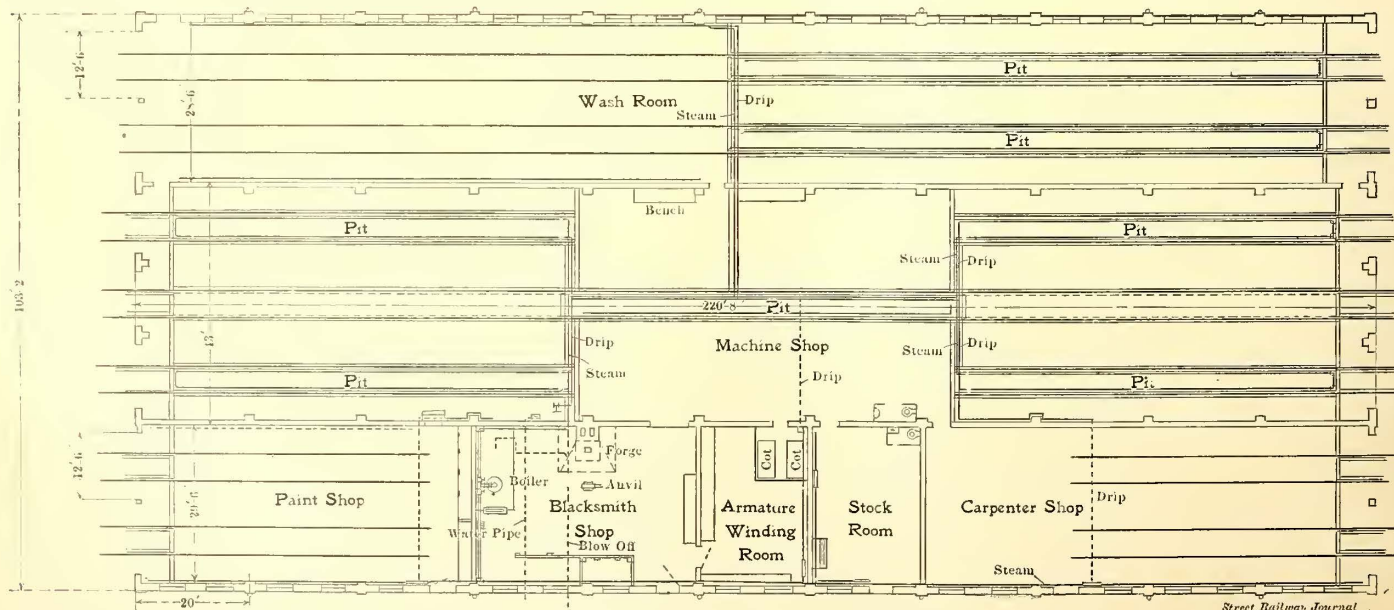


FIG. 2.—PLAN OF CAR HOUSE AND SHOPS

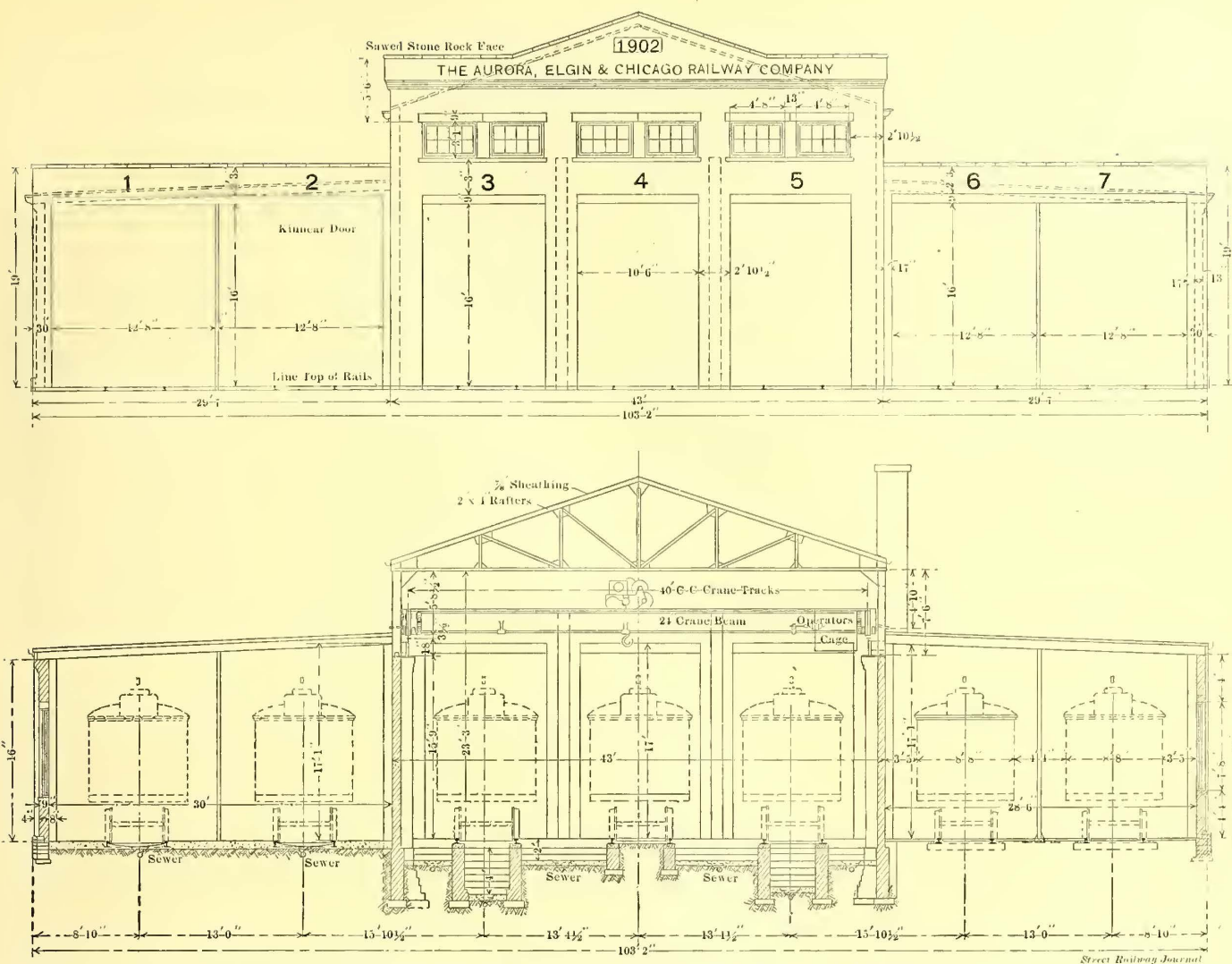


FIG. 3.—FRONT ELEVATION AND SECTION OF CAR HOUSE

between the tracks is lower than the level of the tracks by 20 ins. to 24 ins. The pits are 4 ft. 8 ins. deep. The object of having the floor lower than the track instead of flush with it as is usual is to facilitate work on the sides of the trucks. With this arrangement it is not necessary for a man to lie down to work at the side of a truck. It is a commendable feature and one which could be adopted with profit more generally than it is. The arrangement of pits can be seen both from the sectional elevation, Fig. 3, and from the view taken in one end of the repair shop, Fig. 4.

The central part of the shop is devoted to machine tools, which are arranged on the wall on either side of the track running through the middle. The general arrangement is shown clearly, both in Fig. 1, which gives a general view, and in Fig. 5, which is a view of the central portion of the shop, with the machine tools and the central track given especial prominence. The central track, although provided with a pit, ordinarily has its pit covered, as seen in Fig. 5. In case of emergency the planks covering this pit can be removed so that work can be done under a car if placed in the middle of the shop. Ordinarily this middle space is kept clear. It will be seen from the plan that there is room in the shop for seven cars—three at each end and one in the middle. The space allotted to each car is 70 ft., so that there is in every case room to roll a truck out from under the car, in addition to the room provided for

the length of the car body. The width of the shop which is spanned by the crane is 40 ft.; a view taken in the yards approaching the shop is shown in Fig. 6. In this connection it is to be noted that the company follows the practice of the steam

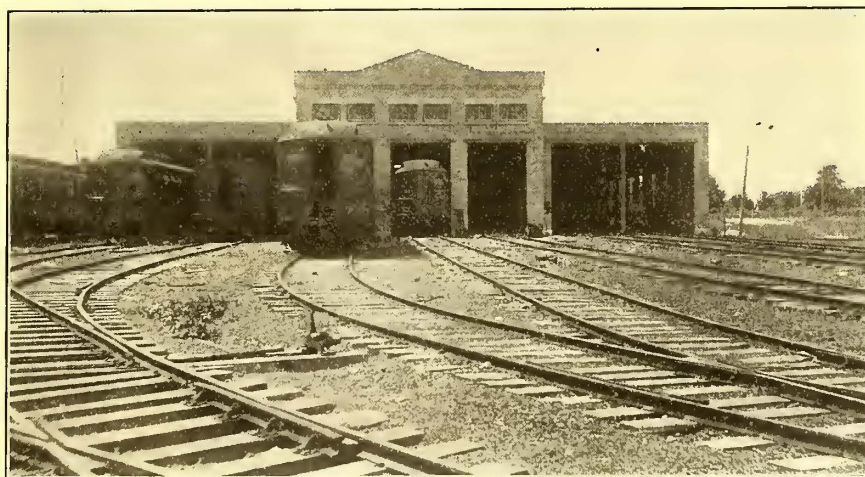


FIG. 6.—SHOPS AND YARDS

roads of storing cars in yards instead of in a car house. There are yards at both front and rear of this repair shop. Both of these yards join a main line, so that the yards are in reality on a loop-off of the main line. The arrangement is a very convenient one, as cars can be passed through the shops and set out on the tracks in the yards in regular order, or can be run past the shop on the outside without entering it, and there is

very little switching to be done to get a car from the main line to the shop and from the shop back to the main line.

Fig. 8 is a view in the shops in which is shown one of the



FIG. 9.—BLACKSMITH SHOP

channel-iron horses for supporting the car body after it has been lifted for the removal of a truck. In Fig. 1 the traveling crane is preparing to lift the end of a car body for the removal of the truck. For this purpose the yoke seen is attached to the hook of the traveling crane, and from this yoke log chains with grappling irons hook under the I-beams, forming part of the sub-frame of the car. To remove the armatures from

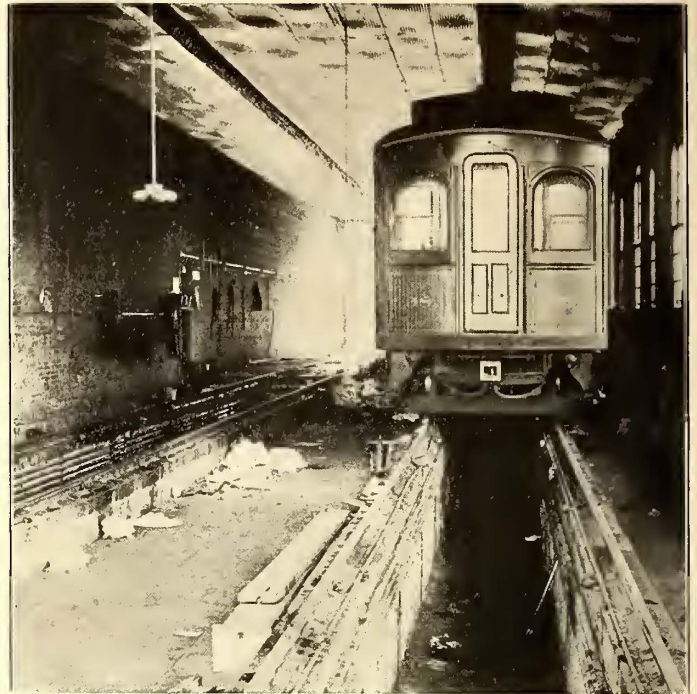


FIG. 8.—INSPECTION AND WASH ROOM.

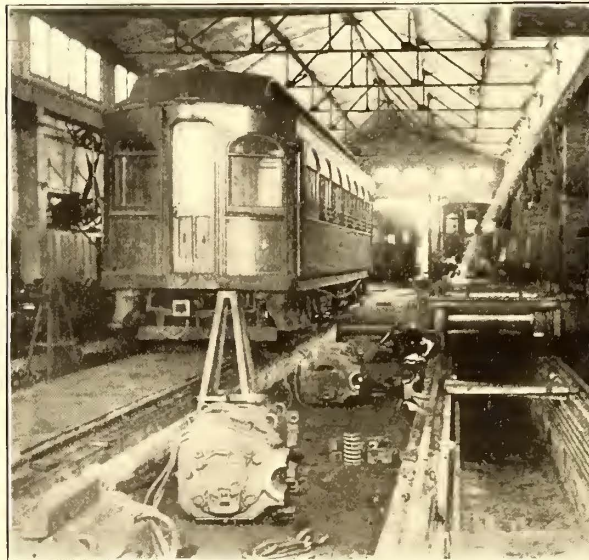


FIG. 4.—RAISED TRACKS AND PIT



FIG. 5.—MACHINE TOOLS AND COVERED PITS

these motors they are lifted out of the trucks by the traveling crane and set on the floor with the pinion up. A hook is then put over the pinion, to which the hook of the traveling crane is attached, and the armature is lifted endwise out of the motor case.

The machine tool equipment seen in Figs. 1 and 5 consists of 3 lathes, 1 shaper, 1 drill press and 1 wheel press. The large lathe for turning down and boring steel wheels and axles, is seen at the right. The hydraulic wheel press is also seen at the right. At the left is a lathe with 8-ft. bed and 24-in. swing, the size suited to the handling of armatures for turning down commutators. Next, to the left, is an emery wheel grinder, and beyond this is the shaper. In the background, at the left, is a small lathe for cutting threads on bolts and similar work.

On one side of the repair shop building is a room for motor inspection and car washing. One end of this room has pits for motor inspection, arranged like the pits in the repair shop. Fig. 8 shows this.

All wiring of the building is in iron pipe conduits, and is shown most plainly in Fig. 8. This conduit is run along both sides of the pit, and combination outlets and sockets are placed

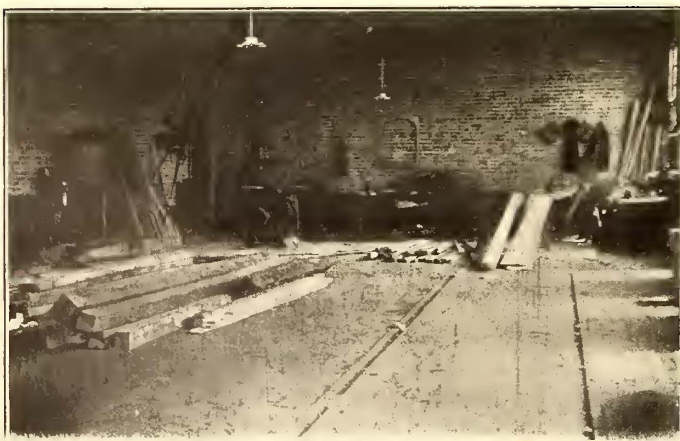


FIG. 10.—CARPENTER SHOP

at regular intervals. The other end of this room has a brick floor, well drained, over which the car washing is done.

On the other side of the repair shop building are the paint shop, carpenter shop, blacksmith shop, armature winding room and stock room. In the blacksmith shop is a boiler which furnishes steam to heat the building in winter. The paint shop and carpenter shop each have room for two cars. The car-

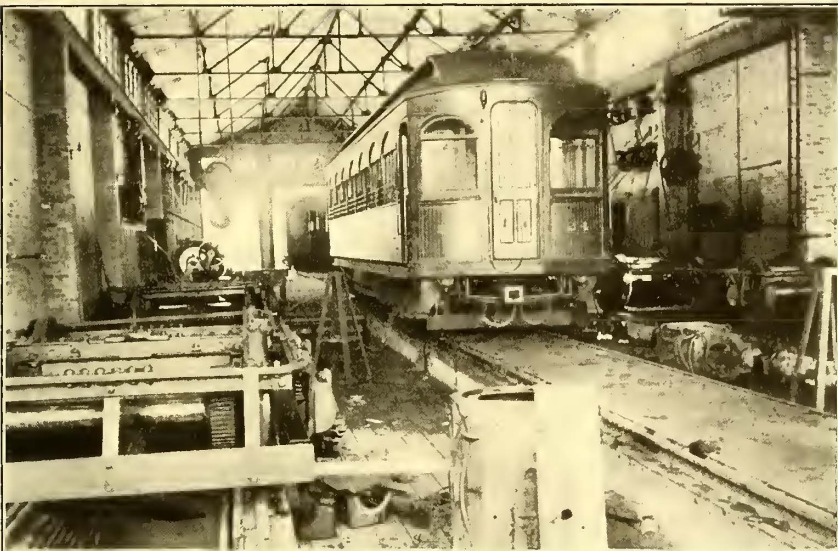


FIG. 7.—EQUIPMENT FOR REMOVING TRUCKS AND MOTORS

penyer shop is provided with a band-saw. Toilet rooms are provided in a building and also place for some employees to sleep. Fig. 9 is a view of the blacksmith shop, and Fig. 10 shows the carpenter shop.

From this description it will be seen that the details of these shops were carefully worked out; that the building is well designed for the purposes to which it is devoted; that the equipment is complete and practicable, and that every facility is offered for ordinary repairs, such as will commonly need to be made on interurban equipments.

Those chiefly responsible for the excellence of these shops are Will Christy, Akron, Ohio, who was general manager of the road during construction, and W. L. Morris, mechanical engineer during construction. The road is at present under the general management of E. C. Faber, and the shops are under the immediate charge of Master Mechanic Miles.

◆◆◆
NETWORK OF WESTERN INTERURBANS
 ◆◆◆

Special press despatches a few days ago announced that plans were forming for a network of electric railways to extend from Chicago to Louisville, Ky. That no systematic effort is being made to complete a line of this kind is well known. However, the despatches are suggestive, and to one going over the routes of the lines now in operation and of projected lines, through travel between these cities looms up as a possibility of the near future. As is well known the objective point of the Indiana Union Traction Company is Chicago, so that between Chicago and Indianapolis, with the exception of a few small breaks, there is more than a paper line. From Indianapolis the Indianapolis, Greenwood & Franklin Company now operates to Franklin, and is rapidly completing its line to Columbus. A line is projected between Columbus and Jeffersonville, which is opposite, and connected with Louisville by several bridges. The last-mentioned gap, therefore, appears to be the only serious one encountered.

The Cleveland Electric Railway Company has removed its city touring car, as it is believed it would not be a paying institution during the winter months.

THE WORCESTER & HOLDEN STREET RAILWAY

One of the most recent electric roads to be placed in operation in Massachusetts began to carry passengers this summer between the city of Worcester and the village of Jeffersonville, via the town of Holden. When completed the line will connect Worcester with the town of Princeton, at the foot of Mt. Wachusett, thereby making this beautiful Bay State landmark easily accessible to some 125,000 inhabitants of the "Heart of the Commonwealth," about 16 miles away. In addition to the through connection with Princeton, the line will bind together the cities of Fitchburg and Worcester by an additional route over the tracks of the Gardner, Westminster & Fitchburg Street Railway through Westminster.

Cars from Worcester for Jeffersonville start from the City Hall in the former place, and are run by Worcester Consolidated crews over the lines of the latter company through Main Street, northward to Lincoln Square, whence they follow Salisbury Street and Grove Street past the Washburn & Moen North Works of the American Steel & Wire Company, to Chadwick Square. At this point the Worcester & Holden track begins and the crews are changed. The line follows Grove Street around the south shore of North Pond, strikes Holden Street and follows the highway to North Worcester, where

it passes beneath the Fitchburg division of the Boston & Maine Railroad and crosses the Holden line not far from Chaffin's Station. From Chaffin's to Holden the line runs for the most part either at the side of the highway or on a semi-private right of way, and after passing through Holden Center again crosses the Boston & Maine tracks, this time on an overhead bridge, coming to an end in Jeffersonville at the power station on the east shore of Eagle Lake. Jeffersonville is becoming well known as a restful country summer resort, and four hotels are now established in the vicinity of the lake.

At present there are twelve scheduled steam trains per day between Worcester and Holden, and nine between Worcester and Chaffin's. At the latter place is located the hydraulic testing laboratory of the Worcester Polytechnic Institute, which has hitherto been relatively inaccessible for students who wished to put in a full afternoon's work on the apparatus, because of the inconvenient distribution of trains. The new electric line will change all this and create a new value to an already useful feature of the Institute's equipment. There are but four Sunday trains between Worcester and Holden, or two in each direction. The country is exceedingly attractive and offers many desirable features for suburban or rural residences. If the experience of other electric roads radiating from Worcester is suggestive, there is little doubt that this hitherto inaccessible region will be extensively developed by the building of the new line.

The length of track operated between Chadwick Square, Worcester, and the Jeffersonville power station is 7.65 miles. From Chadwick Square to the City Hall is about 1.5 miles. The time required to make the run from the City Hall to points along the road is as follows:

City Hall to—	Minutes
Lincoln Square	4
Chadwick Square	11
North Pond Spring	18
North Worcester	20
City Line	23
Chaffin's	27
Holden	33
Car Houses	37
Jeffersonville P. S.	41

Both 90-lb girder and 70-lb. T-rails are employed in the track construction. Gravel ballast and chestnut ties are used, with six bolts per joint at the fish-plates. The riding is remarkably smooth for so new a road, and the track appears as well laid as that on many a steam line, although nothing in the way of very high speed has been attempted so far. Maximum speeds of 35 miles to 40 m. p. h. are easily within the capacity of the equipment, however, and there is no doubt that real rapid transit will be furnished from Worcester through to Mt. Wachusett when the line is completed. Speeds are necessarily limited on the side of the highway, which accounts, to a considerable extent, for the moderate schedule speed of 13.4 m. p. h. in the run from Worcester to Jeffersonville. It is probable that the run from Worcester to Mt. Wachusett will take about 1¼ hours. The fare from any point in Worcester to the city line is 5 cents, and from Holden to Jeffersonville 5 cents. Southbound, the fares are the same, with free transfer to any point on the Worcester Consolidated Company's city lines. Three turnouts have been built between



TYPICAL TRACK CONSTRUCTION

Chadwick Square and Jeffersonville. No fencing of any consequence has been set up, and the maximum grade is 6 per cent. The line is single track throughout, excepting the Worcester Consolidated tracks, and it is bonded with No. 0000 "Crown" bonds, furnished by the American Steel & Wire Company. Several sharp cuts and heavy fills were required, the embankment being especially steep near the Boston & Maine bridge crossing in North Worcester. The track switches are of steam railway pattern, and are opened and closed by hand levers mounted on regular switch stands. The rails are laid in 30-ft.



EAGLE LAKE

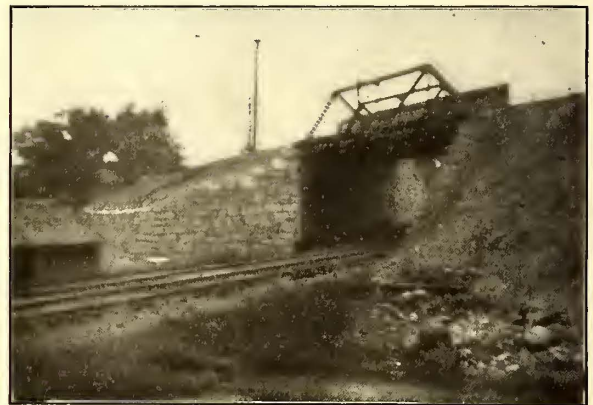
lengths. Special attention has been paid to careful drainage of the track and roadbed. Ties are placed on 24-in. centers. The only bridge which the track passes over is a steel truss structure at Holden, approaching Jeffersonville, which crosses the Boston & Maine tracks.

The overhead system is in the main side suspension, although bracket construction is used in various places. Two trolley wires are installed in parallel over the center of the track, each being a No. 0000 B. & S., figure 8, in section. The poles are of chestnut, 30 ft. to 35 ft. in length. There are two cross-arms

to each pole, with space for feeder, telephone and signal wires. No signal system is as yet installed, but it is stated that the company is planning to adopt one. Glass insulators are used throughout. The line is at present supplied with power under the most disadvantageous conditions so far as the location of the power house is concerned, as it is at the extreme end of the road, but when the Princeton section is completed the plant will be practically in the middle of the line.

The power station at Eagle Lake is a one-story brick building, with a sloping slate roof, terminating in a monitor which runs its entire length. A brick stack, 100 ft. high, and about 12 ft. in diameter at the base, stands at the north side of the building, and is connected directly to the boiler flues without the medium of an economizer. The station floor is some 30 ft. below the level of the highway on which the track runs, and a large coal pocket is being built just south of the building, and at the side of the roadway. This is bounded by a solid masonry wall, and when it is completed a narrow-gage track and coal car will probably be installed to connect the pocket directly with the boiler room. It will then be a simple matter for coal cars to discharge their product directly over the embankment into the pocket. Inside, the building is divided into an engine and a boiler room, separated by a brick partition wall. The roof is supported by heavy wooden trusses.

The boiler room is located next to the railway embankment, and contains two 100-hp boilers, furnished by the Stewart Boiler Works, of Worcester, each 6 ft. in diameter by 20 ft. long. There is room for an additional boiler of the same capacity. The boiler room also contains two American exhaust



BRIDGE OVER BOSTON & MAINE TRACKS

heaters, a Spencer damper regulator, and a Blake duplex feed pump, cylinders 5-in. x 3½-in. x 6-in. stroke. The boiler steam pressure is 120 lbs. per square inch. The room is lighted by five 16-cp lamps on the railway circuit, and it will be equipped with scales as soon as possible, in order that records of fuel consumption may be kept. There is also an injector for supplying the feed water, which, with the condensing water, comes from Eagle Lake. A large double door in the south wall facilitates the entrance of machinery and supplies. There is no provision for automatic firing. Ashes will probably be handled by a car and narrow-gage track scheme. Practically no duplication of piping exists, the steam being carried through the plant to the engines in a single main pipe.

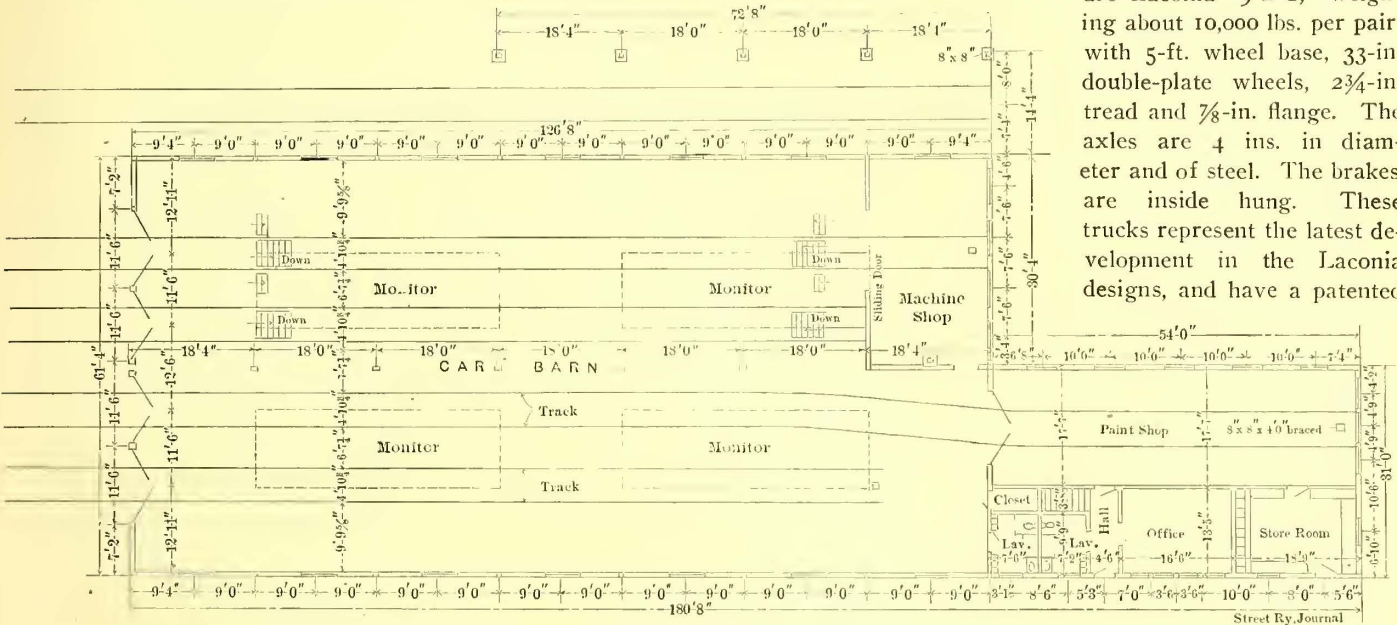
The engine room is extremely well lighted, especially on the western side nearest the lake, and is also provided with a double door for the ingress or exit of machinery. The walls are whitewashed, and fifteen windows are set in the sides, exclusive of the monitor windows at the top. Artificial lighting is furnished by seven clusters of 16-cp incandescent lamps, which depend in groups of five from the wooden beams overhead. At present there are in use two 250-hp Armington & Sims horizontal tandem-compound engines, with cylinders 13 ins. x 18 ins. diameter and 24-in. stroke, belt-connected to four 90-kw

T. H. railway generators, installed on account of the desire of the owners to see the road in operation as early in the season as possible. The switchboard is of the wooden frame type, and there is little doubt that the near future will witness the replacement of this temporary apparatus by engines, generators and a switchboard of more modern design. The condensers and pumps are of the Knowles pattern, the suction pipe being 8 ins. in diameter. Eagle Lake supplies the condensing water, and the boiler supply pipe is 3 ins. in diameter. The machinery was installed by the aid of tackle rigged around the wooden truss beams.

The rolling stock is one of the strongest points in the road's favor with the public. The cars are seven in number, and are

	ft.	ins.
Wheel base	4	6
Wheel diameter		33
Wheel Tread		2½
Wheel Flange		⅞
Weight of trucks per pair.....	9500	lbs.

The open cars were made by the Laconia Car Company. Each has thirteen benches, closed ends and three drop sashes; nine of the seats are reversible. The length over dashers is 37 ft. 4¼ ins., and the width over posts 7 ft. 6 ins. The over-all width over the running boards comes to 8 ft. 11¼ ins., and the height from the bottom of the sill to the top of the trolley board is 9 ft. 3 ins. The weight of the car body is 11,000 lbs. Trucks are Laconia "9-B-2," weighing about 10,000 lbs. per pair, with 5-ft. wheel base, 33-in. double-plate wheels, 2¾-in. tread and ⅞-in. flange. The axles are 4 ins. in diameter and of steel. The brakes are inside hung. These trucks represent the latest development in the Laconia designs, and have a patented



CAR HOUSE AT JEFFERSONVILLE

very attractive in design and finish. Three are closed and four open. The former were supplied by the Bradley Car Works, of Worcester, and their principal dimensions are:

	Ft.	Ins.
Length of car body	30	0
Length of car over all	40	4
Width of car over all.....	8	½
Height inside, floor to roof	7	10
Width of aisle, between cross-seats.....		17
Width of aisle, between longitudinal seats..	3	4
Width of vestibule inside.....	6	3
Length of vestibule inside.....	4	2
Weight of body	16,000	lbs.

The inside finish is of cherry. Plate-glass, 3-16 in. thick, is used on the windows, which are eleven in number on each side, with compound sashes, the lower sash being raised when desired. There are ten cross seats, upholstered in crinm plush, and four longitudinal seats, supplied by the Heywood Brothers & Wakefield Company, the total seating capacity being forty-four. Consolidated car heaters are installed, with the switches in the vestibule. The hand brakes are of the wheel pattern. Inside each of the closed cars are fourteen 16-cp lamps, eight being installed in the monitor roof and three on each side. The air brakes are Christensen, running at 70 lbs. pressure per square inch in the gage, and there are two trolleys per car. Pfingst fenders are in regular use, and the registers are of the International type. The cars are painted an attractive blue color. Kilbourn sanders and Wilson trolley catchers are used.

These closed cars are to be equipped, as are the open, with Mosher arc headlights. The signs are of the four-sided pattern, reading "Worcester," "Jeffersonville," "Holden" and "Special." The closed cars are each mounted on two Taylor trucks. The principal truck data is:

swing bolster which is especially arranged to enable curves to be run at high speeds. The elliptic springs which formerly rested near the jaws of the truck have now been arched higher and the ends brought nearer together so as to rest on spiral springs attached to the truck frame proper. The arrangement practically constitutes an equalizer bar.

The floors of the open cars are finished in hard pine, slatted between the seats. The running boards fold up when desired, and drop side-guard rails have been furnished, divided into two sections per side for the conductor's convenience in raising and lowering. Double trolley and Pfingst brake handles were supplied, and solid bronze trimmings used throughout. The monitor roof extends over the vestibules, and is of steam car pattern. The ceilings are of white birch, decorated, and the seats are of white maple. Side curtains run to the floor and are of waterproof duck.

All of the cars are equipped with General Electric "67," 38-hp motors, there being four per car, outside hung with nose suspension; K-6 controllers are used and the gear ratio is 65 to 19, or 3.42.

The car house is now being built at Jeffersonville. Its capacity will be eight cars, and it contains four spur tracks. The length of the car house proper is 126 ft. 8 ins., and its width 61 ft. 4 ins., while the total length is 180 ft. 8 ins. The building will also contain a paint shop, a machine and repair shop, toilet room, general offices of the company, and a store room. On the west side will be an open shed, and in the yard an extra spur track for car storage.

The company's offices are at present located at 452 Main Street, Worcester. The line was built under the supervision of Albion R. Clapp, of Wellesley Hills, a director of the Boston & Worcester Street Railway. A. W. Woods, of Worcester, was

the civil engineer. The present officers are: President, General Augustus B. R. Sprague, of Worcester, who is also president of the Worcester Electric Light Company, and the Mechanics' Savings Bank, of that city; vice-president, H. W. Warren, of Holden; clerk and superintendent, E. S. Douglas, of Worcester; purchasing agent, A. R. Clapp, of Wellesley Hills; electrical engineer, E. B. Nichols. The chief engineer of the power station is E. A. Cross. James T. Rood, of Worcester, acted in the capacity of advisory electrical engineer in the early stages of the road's development.

Taken as a whole, the Worcester & Holden Street Railway stands as an interesting example of modern trolley construction in track, rolling stock, roadbed and overhead system. While it is a straight direct-current road and has no interesting complications of alternating apparatus to exhibit, it is particularly noteworthy as the latest spoke in the traffic wheel which is fast turning Worcester into one of the most prominent electric railway centers of New England. The reflection of its operating results will be analyzed with care in the reports of the State Railroad Commission of Massachusetts from year to year, and if a progressive policy is followed by the management in regard to the reduction of operating expenses by the improvement of the power station equipment, there is good reason to expect that the new line will become an important and useful link in the chain of electric roads covering Northern Massachusetts.

PROTECTIVE DEVICE FOR TROLLEY AND FEEDER WIRES

Cleveland, Sept. 5, 1903.

EDITORS STREET RAILWAY JOURNAL:

Interruptions to electric car service are avoided by street railway managers as far as possible at all times, every precaution being taken to prevent short circuits from wires and cables crossing above the trolley wire. Of course, the fewer of these the better for all concerned, especially in sleety weather.

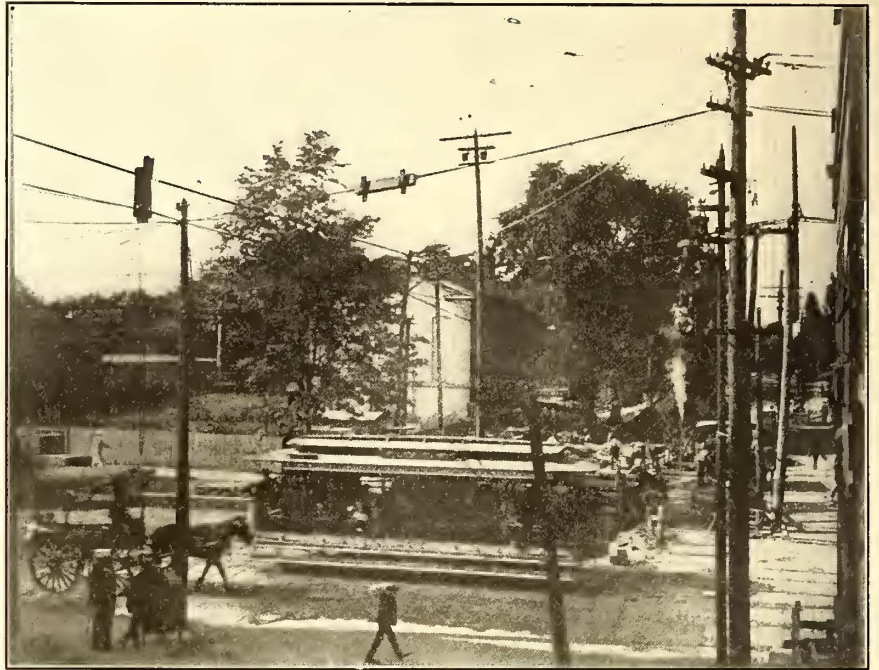
In almost every instance a street railway could be operated uninterruptedly during sleet storms and heavy snow storms were it not for the falling of telephone and other small wires across the trolley lines. Such cases as these are not under the control of the street railway company, but a systematic raid against poor construction, and a little oversight and lookout for old wires will reduce to a minimum troubles incident to falling wires.

However, there are occasions where the linemen can make provision for what would otherwise cause delays and entail costly repairs, and possibly loss of life. The accompanying photograph illustrates a case in hand.

A sewer is to be run beneath the car tracks; the construction equipment being provided with overhead wire cables and traveling buckets, with the wire cables of the sewer construction company dangerously close to the telephone cables and the street railway feeders. To protect these circular loom or some similar material is placed over each cable. These are then clamped together with bolts passed through a piece of 2-in. x 4-in., near each end of the boards, which are of 7/8-in. pine. The necessity for protection at this point is the swinging upward of the wire cables of the construction company as the bucket passes. The clamping together is shown in the upper central portion of the illustration. Circuit breakers are also placed in each trolley wire, one over each side of the street,

allowing plenty of room for the swinging of the bucket or of the chains.

Track cross-overs are also brought into use. While one of the tracks is undermined the cross-over enables the cars to go around the obstruction. During the days of "dinky" cars run



PROTECTING TROLLEY AND FEEDER WIRES

by horse and mule power, track cross-overs were hardly essential to a well-regulated road. The writer recalls a case in a Southern city where a load of hay broke down on the car tracks. The driver scarcely slowed up; but with a "gee!" and a pull, drove his car around the obstruction and came out upon the track again as if nothing had occurred.

In the spring of '99, when the tracks of the street car lines of Covington, Ky., were in some places under a foot of water, after trying vainly to find the tongue of a switch at a certain corner, a driver was helpless, when an assistant superintendent, from his post of observation on the sidewalk, took in the situation and waded to the car, starting the team, and with lines in hand directed its progress around the corner, the car bumping up and down over the uneven block-paved street.

These cross-overs are sometimes very inconvenient and annoying, especially so when the motorman, from some cause, stops between circuit breakers in the dead section. The conductor may at the time be very busy; but must dismount and swing the trolley across to the other track, or swing to the opposite end of the car—a very troublesome proceeding with double-track cars, when he is obliged to climb upon the car to put the trolley in place upon the wire. This all takes time, and the resulting mix-up is anything but agreeable.

The illustration given shows the work of a sewer construction company in progress at the intersection of Euclid Avenue and Doan Street, in the city of Cleveland, Ohio.

A. B. WEEKS.

"A slow service bringeth forth slow dividends." No, that isn't a quotation from the Bible, nor an aphorism from Poor Richard's philosophy in the "Saturday Evening Post." It is merely the result of a paroxysm of pain suffered by a good resident of one of the cities in Western New York, where the Mayor and the local street railway manager are at odds. But that isn't nearly as interesting as the poem written by a local man in the city referred to, which begins: "The street car man, with his lively pen." But why inflict unnecessary pain on the reader?

PREDICTION AS TO THE COMPLETION OF PHILADELPHIA'S UNDERGROUND AND ELEVATED SYSTEMS

A prominent officer of the Philadelphia Rapid Transit Company declared that the underground railroad from City Hall to Twenty-Third Street and the elevated road from the latter point to Sixty-Third Street, will be in operation within the next two years. The task upon which the company is engaged is a gigantic one. In addition to the underground and elevated road 75 miles of surface roads are to be built. These lines are being built with two objects in view—the better accommodation of the public and to increase the earnings of the company. Consequently, parts of the system will be put into operation as rapidly as they are completed.

PROGRESS BEING MADE

Rapid progress is now being made on the line between Twenty-Third Street and City Hall. This portion of the system will be four-tracked. Two of the tracks will connect directly with the elevated road, which will be a double-track structure, and two will connect with the surface lines, which will use the present Market Street Bridge, the latter gradually descending to the underground after leaving the bridge.

The four underground tracks will be continued to City Hall, at which point they will separate, one passing north to Filbert Street, south on Juniper to Market, then down Market to Front. A second track will pass south on Broad to Penn Square, east to Juniper, north to Market, and down Market to Front. Thus, the Market Street underground east of City Hall will only be double-tracked, against four tracks west of City Hall to Twenty-Third Street.

In addition, another line (underground) will run from a point on Market Street, just west of City Hall, north on Broad to Arch, down Arch to Fifth, south on Fifth to Walnut, west on Walnut to Broad, north on Broad to Penn Square, and thence to a connection with the four tracks on Market Street. The object of this "loop" is to enlarge the shopping district—that is, to make Arch Street and Walnut Street as easy of access as Chestnut or Market, and cars will be so run as to carry out this object. The present plan is to run the surface cars—those which now come over the Market Street Bridge, and which will enter the tunnel at Twenty-Third Street—all the way down to Front Street. But some of these cars, like those from the elevated, may be diverted at Broad Street and Market Street to the "loop," already described.

THE PLANS FOR STATIONS

The company has already purchased the properties between Front Street and Water Street and Arch Street and Market Street, and on this location the elevated road again forms a part of the system, and an important part of it, too, for a double-track structure will extend from this point down to South Street, the underground lines coming to the surface at Front Street and Market, and gradually ascending to the elevated road. Thus, the system will pass every important ferry in the city.

The cars which now turn from the cross-town streets into Market Street east of Twenty-Third Street, will be operated as at present. That is, they will continue on down Market Street as surface lines, their tracks passing over the underground road.

Stations for the underground have already been selected in a number of cases. The western terminal will be at Sixty-Third Street and Market Street, where property has already been acquired for the purpose. A second station will be located at Thirty-Second and Market, at the Pennsylvania's station at that point; another at Twenty-Third and Market, at the City Hall, on the south side of Market, just below Eighth, the property for which was purchased some time ago, and at Front Street and Market Street. The largest station, however, will be at the City Hall, and will extend entirely around that building.

The Pennsylvania Railroad will build an underground tunnel or passageway from the Broad Street Station to the underground road, so that passengers from the Pennsylvania trains desiring to take a car for other parts of the city need not leave the railroad station to do so. The Reading, it is expected, will make similar arrangements, although nothing in that direction has yet been done by that company. In addition, it is not unlikely that several of the principal department stores will ask for this privilege—that is, of connecting their stores with the underground road; in fact, such permission has already been asked. These connections, by the way, are made at the expense of the railroads and stores.

INSURING IMPROVED HYGIENIC CONDITIONS IN ST. LOUIS CARS

The St. Louis Transit Company, of St. Louis, Mo., has changed the plans of construction of 450 new cars now building at the works of the St. Louis Car Company, so as to insure almost perfect hygienic appointments. The carving or fancy finish, liable to catch dirt, has been eliminated, and instead of wooden beams and sills steel will be used. The claim of advantage in using the latter is that it can be more readily cleaned, will be smaller and present shallower crevices than the wood. The cars, according to the specifications, will be models of neatness and comfort. They are to be finished in mahogany like the new Pullman cars, which are comparatively plain. In general appearance they are to be similar to the new coaches on the St. Louis & Suburban road, except that only one (the front) platform will be a closed vestibule. The rear platform will be a broad double arrangement like that on the Olive Street cars. This platform was designed by Mr. Dupont, vice-president of the company, and is commonly known as the "Detroit" platform. A feature of the window sockets or grooves on the sides of the new coaches will be a panel which remains closed whether the sash is up or down. At the bottom of the groove, under the car, will be an opening through which any dirt that sifts in may be dropped. The seats are to be so arranged that dirt cannot accumulate. In accordance with the regulation passed recently by the city authorities, the new cars are to be equipped with power brakes. The brake to be used is that made by the Westinghouse Company, and consignments of it are already being received. All of these cars will be ready for service before the Louisiana Purchase Exposition.

THE RECONSTRUCTION OF THE RHODE ISLAND COMPANY'S LINES AT PAWTUCKET

The Commissioner of Public Works of Pawtucket, R. I., has just granted the first of the necessary consents to the Rhode Island Company for the reconstruction of part of its system in that city. As will be remembered, it was but a few months ago that the differences between the company and the city officials were adjusted so as to permit the rehabilitation of the system to conform with that operated by the company in Providence. The system, as at present operated in Pawtucket, is over a narrow-gage line laid with light-weight rails, and the cars are very antiquated, even the old method of rheostat control being still in use. The permission which has just been granted provides for the construction of the Prairie Avenue road and also for changing of the gage of the line on Prospect Street. The latter work is being done from Main Street Bridge to the terminus of the present line, and the line will probably be connected with the new Phillipsdale extension. The plan of the company, it is said, is to push the work on the two improvements, so as to have them completed this winter. Then, with the beginning of spring, the complete reconstruction of all the lines will be begun in earnest. At the present time the Prospect Street line from the Phillipsdale end to the Pawtucket

city line is completed, and ears are running as far as the standard gage tracks are laid. However, it is necessary for passengers to change cars and walk a considerable distance in order to board the Prospect Street ears and go toward the city. The Prairie Avenue route will run from Prospect Street to Division Street, to Arch Avenue, Pond Street, South Bend Street, to the railroad track. This is an entirely new line and will be the means of opening up a section that has never had railroad facilities. In reconstructing its lines at Pawtucket the company will, of course, do away with the small cars now in use, and probably substitute for them modern double-truck cars, such as it operates in Providence. An unofficial estimate of the cost of the work to be carried out places it at more than \$1,000,000.

GASOLENE CARS FOR INTERURBAN SERVICE

Mention has previously been made in these columns of the probability that experiments would soon be tried on some roads in the Middle West with gasolene motor cars. This statement was based on the knowledge that the Chicago Motor Vehicle Company had been experimenting with a gasolene railway car of the same general type as the brakes, busses and auto coaches which are such familiar sights in Chicago streets, and which have been in regular service there for a number of months.

The company has had one of these gasolene street cars in switching service in the railroad yards at its factory, Harvey, Ill., for some time. The first railroad company to adopt these cars is the Tabor & Northern Railway, of Southwestern Iowa, of which Robert McClelland is general manager. This is a road 9 miles long, connecting the college town of Tabor, which has a population of about 1000, with the main line of the Chicago, Burlington & Quincy Railroad at Malvern, Ia. The passenger service to be provided for on this line is similar to a number of other places where the investment necessary to put in an electric railway would not be justified, because of the light traffic, while a gasolene motor ear, in comparison, is practicable, is believed to be cheaper in operation and maintenance and may fill a hitherto neglected place in the transportation field. The gasolene motor car illustrated herewith has been found to be practicable, and is similar to the gasolene auto coaches which have been used so extensively in Chicago, except that flanged wheels have been substituted for rubber-tired wheels, while the steering and differential gears have been omitted.

The weight of this ear is 7500 lbs. and seats are provided for comfortably seating twenty people. The entrance is at the front, so that all passengers in and out of the ear pass the motorman, who collects the fares as well as operates the ear, thus dispensing with the services of a conductor. As this car is considerably lighter than a light electric car it can be operated over a much lighter track without excessive track deterioration.

The cost of gasolene per mile for coaches of this kind running on paved streets in Chicago is given as about 1 cent. For cars operating on rails and making fewer stops the cost would probably be less, unless the maximum speed was increased so as to compensate for the fewer stops.

The gasolene engine used on this car has two cylinders opposite each other, so that they counterbalance and reduce vibration. The capacity of this gasolene engine, when run at a maximum speed of 500 r. p. m., is upward of 25 hp on a brake test. The engine can be speeded up to give more power, although the manufacturing company does not recommend high-speed engines for ordinary service, and, in fact, with the engine running at 500 r. p. m., as high a speed as desired with a light single-truck car can be attained, namely, about 20 m. p. h., to 25 m. p. h.

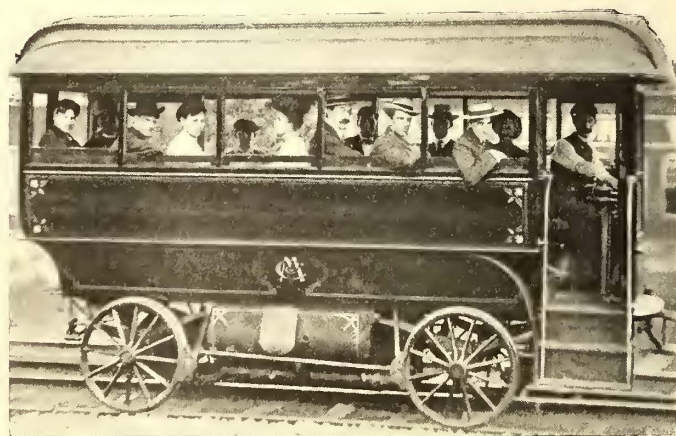
The application of power is by what is known as the "Worth

Traction Drive." This mechanism for starting the car from a state of rest is much simpler than any of the changeable speed clutch mechanisms with speed gears used on automobiles, and for this reason it is especially adapted for railway service.

The gasolene motors are mounted on a tubular steel frame which rests on the springs of the car. The car body rests on this frame, and is independent of the engine and driving mechanism. The motors are of the four-cycle type, and are provided with a governor to prevent racing when the load is thrown off. This governor also regulates a mechanical sparking and igniting device automatically controlled to conform with the speed at which it is desired to have the motors run. The governor can be set for any engine speed desired, although the required variation of the car speed is obtained by the traction disc driving arrangement, which is at all times under the direct control of the operator.

The motor drives a pump for keeping the water in circulation around the jackets of the engine cylinders and through the cooling coils. It is arranged so that the circulation of the cooling water is through pipes in the car, which may be regulated to make the desired temperature within the ear body.

Taking into consideration the fact that a lighter track can be



GASOLENE CAR FOR INTERURBAN SERVICE

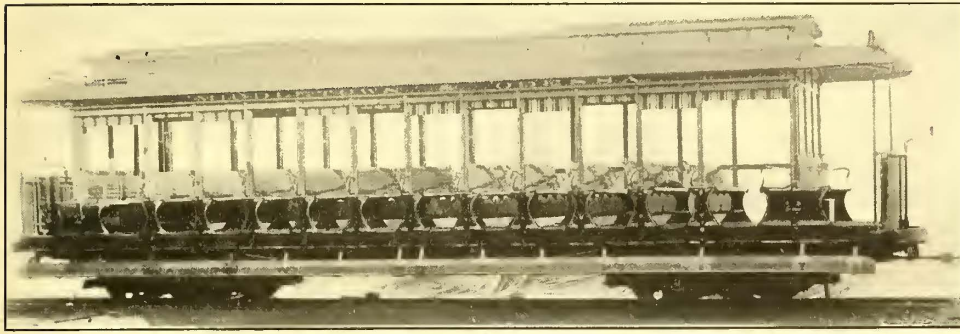
employed under cars of this kind than under the usual electric or steam interurban cars, the designers of this system believe that gasolene-motor roads should be built and equipped for about one-half to one-third the cost of an ordinary electric or steam railway; and reduction of fixed charges should be from one-half to two-thirds less, which is a very important factor in the possibilities of gasolene-motor railway building to serve rural districts. Roads equipped with this system may go a long way toward solving the problem confronting so many railway companies operating interurban and suburban lines, and it is expected that this system, on account of the comparatively small amount of capital required to equip and maintain it, will show good profits from the start.

The gasolene automobile has reached a state where there can no longer be any question as to its commercial success, although the time will probably never come when the gasolene engine will not need some skilled supervision; but this skilled supervision, as the simplicity of gasolene engines become better known and understood, will be easier to obtain from year to year as they come into more general use. Furthermore, improvements are constantly being made in details which increase the reliability and reduce their cost of maintenance. Just what the cost of maintenance will be will depend very much on the condition of the roadway and the supervision and care given the equipment.

The natural growth of traffic on the Metropolitan West Side Elevated Railway, of Chicago, is being retarded by the introduction of universal transfers on the Union Traction Company's lines.

NARRAGANSETT TYPE OF CAR FOR DELAWARE

The type of car shown in the accompanying illustration



NARRAGANSETT TYPE OPEN CAR

built by the J. G. Brill Company, has recently been put on the line of the Odessa & Middletown Street Railway Company, Middletown, Del., to handle crowds of excursionists on this line during the summer months. As is generally known this type has double steps with the upper step on the lower flange of the Z-bar sill, making an easy pair of steps to mount and

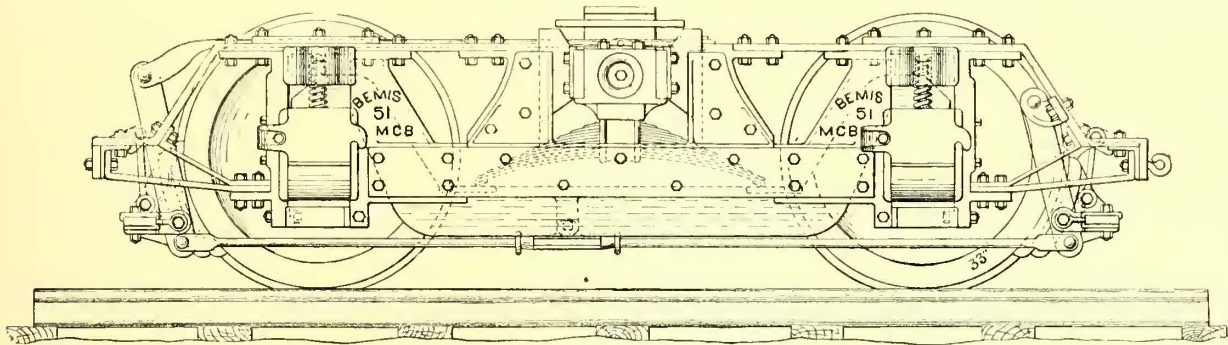
of cherry and ash, with birch ceilings, decorated with a neat pattern. Dumpit sand-boxes, radial draw-bars, angle-iron bumpers, ratchet brake handles and Dedenda gongs are included in the equipment.

The trucks are Brill No. 27-G with 4-ft. wheel base, 33-in. wheels and 4-in. axles; they are equipped with two motors, each 25 ft. Weight of car and trucks, with motors, 35,260 lbs.

THE BEMIS NO. 51 TRUCK

This new M. C. B. type of truck, which was the subject of so many favorable comments at the recent Saratoga Convention, has been especially designed for the very heaviest electric high-speed service. This truck possesses all the M. C. B. standard equalizing bar features, combined with some of the best recognized ideas of regular electric truck construction. It is designed to carry inside suspended motors of the heaviest types made.

The method of distributing or dividing the weight of car



SIDE VIEW OF BEMIS NO. 51 M. C. B. TRUCK

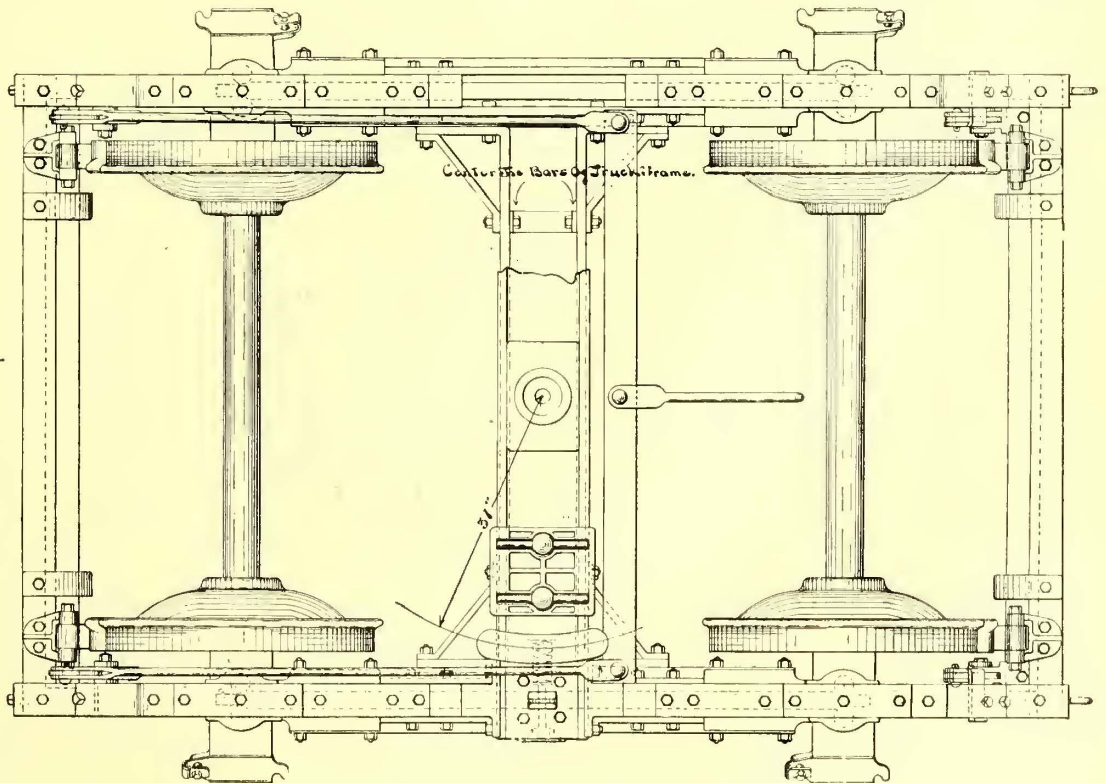
dismount, and at the same time the width over all does not exceed the usual single-step open car width. It is practically impossible to have the floor of a car mounted on double trucks lower than 36½ ins., consequently a single step would be inconvenient and unsafe.

As the illustration shows, the posts are bracketed to the sills, and Brill patented round-corner seat-end panels are set upon the brackets and inclose the posts. It will be seen, therefore, that both panels and sills are arranged to economize space without detracting from the valuable features of standard construction. The seats are a trifle longer than usual, and will accommodate six passengers of average size.

The length of the car over crown pieces is 40 ft. 4⅜ ins., the width over sills 8 ft. 2 ins., and over posts at belt 8 ft. 7 ins., from center to center of side posts 2 ft. 6 ins., sweep of posts 2¾ ins. The inside finish is

bodies upon the trucks in this class of service is in the No. 51 truck somewhat novel, where high acceleration of speed is attained, and where frequent and quick stops are required.

The frame construction is of the built-up type, in conformity

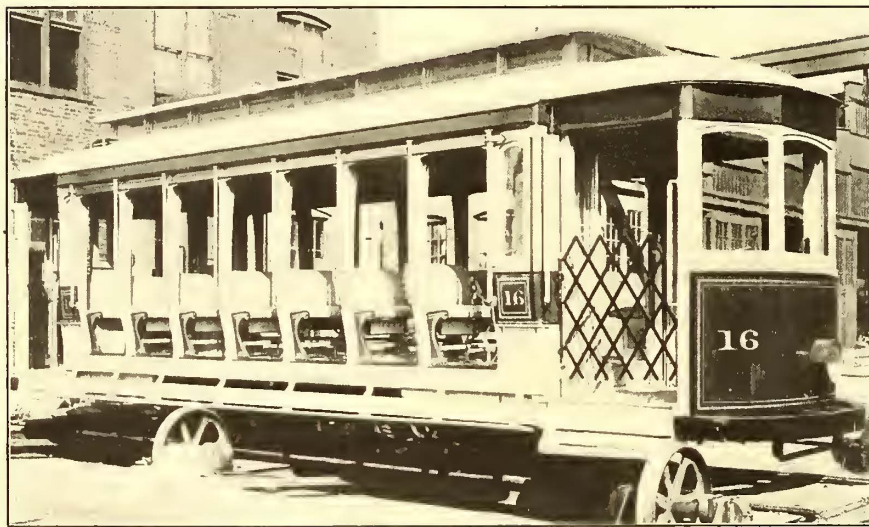


TOP VIEW OF BEMIS NO. 51 M. C. B. TRUCK

with the regular standard M. C. B. equalizing bar methods. The inside or pivotal bolster is suspended to the outside or transom bolster, which latter rests upon long semi-elliptical springs. These springs are supported by the equalizing bar, the ends of which rest directly on the journal boxes, and carry the entire weight of the car body, relieving the truck frame proper from this strain. The work that then devolves upon the truck frame is to hold the wheels in alignment and to carry the weight of the motors, which are spring suspended. In general, the construction of this truck is extra heavy and strongly built, weighing from 10,000 lbs. to 12,000 lbs., and accommodating the heaviest wheels and axles.

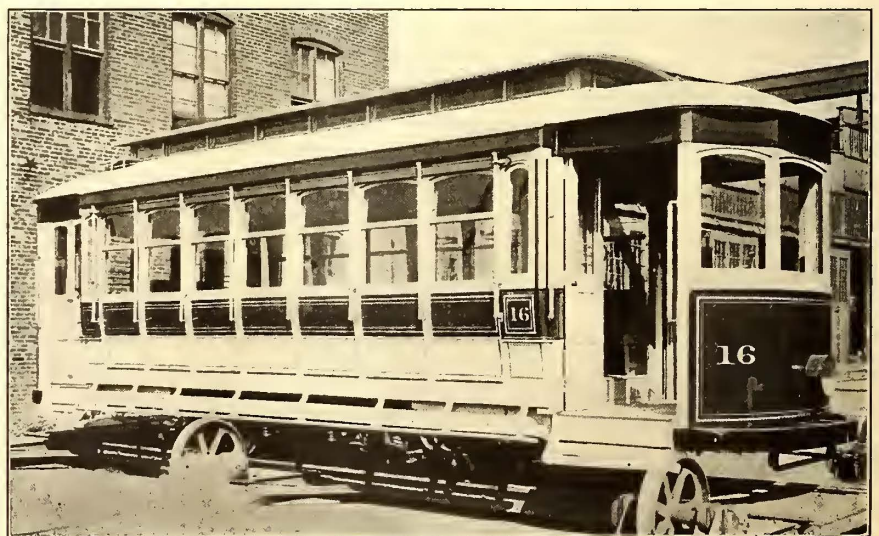
CONVERTIBLE CARS FOR MARQUETTE, MICH.

The city of Marquette, Mich., on the southern shores of Lake Superior, is an excellent place to test the weather qualities of the Brill type of convertible car. In winter the city is exposed to the intensely cold winds from the lake, and it is, therefore, necessary to have cars which are capable of retaining heat. This type of car is used in several of the cities of this State on the shores of Lake Michigan and Lake Huron, and has already demonstrated its ability to retain heat quite as well as cars of standard construction. The Marquette & Presque Isle Electric Railway has lately received four semi-convertible and two convertible cars from the American Car Company, of St. Louis, both types of cars being practically the same in length and width. The cuts show the convertible car.



CONVERTIBLE CAR OPEN

which is 20 ft. 7 ins. over end panels, and 30 ft. 7 ins. over crown pieces; width over side sills 7 ft. 9 ins., and over posts at belt 8 ft. 5 ins., thickness of corner posts $3\frac{3}{4}$ ins., of side posts $3\frac{3}{8}$ ins. From center to first side post over corner post 15 ins. These posts are connected with solid panels, from center to center of side posts 2 ft. 7 ins., sweep of posts 4 ins. Panels and sashes are stored in roof pockets when not in use by the well-known method used in this type of car. The inside finish is ash, with ceilings of decorated birch. The seats are reversible, made of spring cane, and afford seating capacity for thirty-two. The length of seats is $34\frac{3}{4}$ ins. Cars are vestibuled at either end, with dashers wainscoted and arranged with pockets for vestibule windows. Sizes of side sills $5\frac{1}{4}$ ins. x 6 ins., plated on the outside with $\frac{5}{8}$ -in. x 6-in. steel; end sills $4\frac{1}{2}$ ins. x 6



CONVERTIBLE CAR CLOSED

ins., from rail to platform steps $14\frac{1}{2}$ ins., from step to platform 13 ins.

The six cars are mounted on Brill No. 21-E trucks, with



INTERIOR OF CONVERTIBLE CAR

7-ft. 6-in. wheel base, and 33-in. wheels, and equipped with 38-hp motors; weight of a car and truck without motors about 18,000 lbs.

The illustrations show the appearance of the car open and closed, and a general view of the interior.

VISIT OF THE ROYAL TRAFFIC COMMISSION

The Royal Commission on London Street Traffic, appointed to investigate traffic conditions of the United States, is expected to arrive in New York Sept. 26, on the White Star steamship "Arabic." The party consists of Sir David Barbour, K. C. M. G., K. C. S. I.; Lord Ribblesdale, Sir John Dickinson-Poynder, Bart., D. S. O., M. P.; Sir Francis Hopwood, K. C. B., C. M. G. (permanent secretary of the British Board of Trade); Sir George Bartley, K. C. B., M. P.; George S. Gibb, manager North-Eastern Railway, and Lynden Macassey.

The committee will commence its hearings in New York soon after arriving and will probably visit other cities in the United States before returning to London.

A NEW ELECTRIC BRAKE

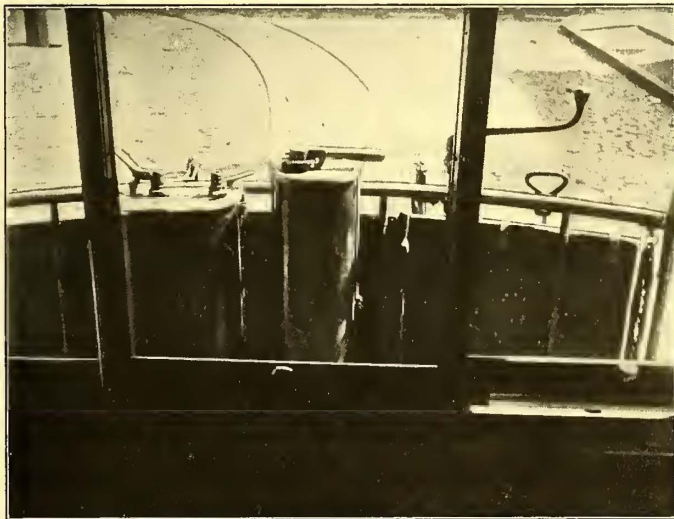
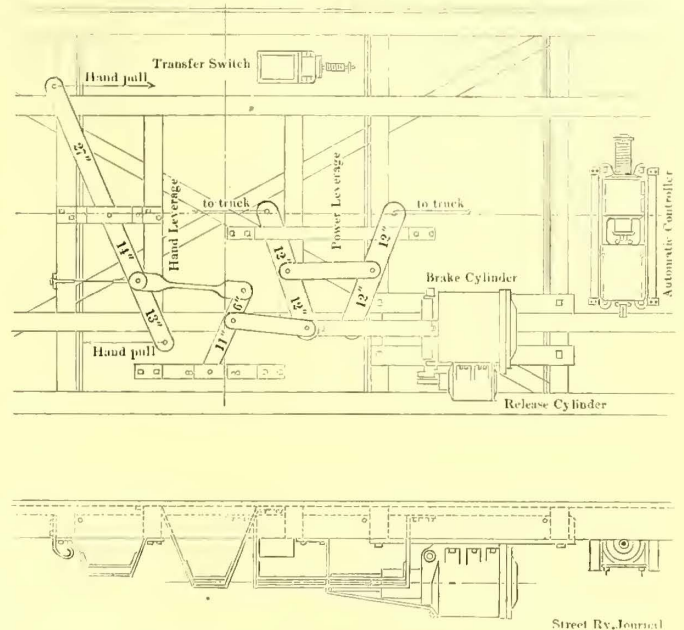
For the past two months an electric brake, made by Price, Darling & Company, of New York, has been in operation on the system of the Brooklyn Rapid Transit Company, Brooklyn, N. Y. As this brake possesses some novel features a description of its parts and operation may be of interest.

Car No. 601, on which this brake is now in service, is used on the Southern Division of the Brooklyn Rapid Transit system. The route traversed is an exceptionally good one for testing braking apparatus, as the cars on this line run not only through crowded city streets, which necessitate slow running and frequent stops, but also travel at high speeds over miles of somewhat hilly country on the way to Coney Island. As many as 2000 stops per day are sometimes made under the varied conditions on this line.

The car is of the twelve-bench open type and is mounted on Brill "Eureka" maximum traction trucks, fitted with 33-in. drivers and 20-in. pony wheels. The operating equipment consists of two No. 68 Westinghouse motors geared 14:68, and two K-11 controllers; the braking equipment of two C-7 Price-Darling controllers mounted on platforms, together with an electromagnetic brake cylinder, automatic controller and transfer switch under the car and a regular hand brake outfit. The total weight of the car when empty is about 13 tons, and of the electric braking equipment approximately 1350 lbs.

As shown in the accompanying cut the brake controller is

which is but a small portion of the total capacity of the motors, and, therefore, does not increase their heating appreciably. By an electric interlocking device in the brake controller the



VIEW OF CAR PLATFORM

somewhat narrower than the K-11 controller, being about 10 ins. wide. The one illustrated herewith projects above the dashboard, but this is exceptional, as this braking equipment was originally designed for a car having a higher dashboard. The brake controller has six notches, one for the general operation of the car, four braking positions for several rates of retardation and one for releasing the brake. Moving the brake controller from the running position to any of the braking positions cuts off the trolley current from the motors, applies it to the brake and converts the motors into generators for supplying current to the electromagnetic brake cylinder. When the generators deliver current in sufficient quantity the trolley circuit is automatically cut out by the transfer switch and the braking current is derived from the momentum of the car. If, however, the car is moving very slowly the trolley current remains in the circuit and furnishes the braking current, which in this case never exceeds 10 amps. at 500 volts. It has been found that with the present equipment the maximum current used to make a high-speed stop does not exceed 125 amps. at 125 volts,

latter is prevented from being returned to running position until the power controller is returned to "off" position, preventing any injury to the apparatus due to a sudden and unexpected start. As the car approaches a stop, when using this brake, a locking device in the brake cylinder holds the shoes on without using any power until the motorman releases them in the "release" position of the controller.

As the action of the brake is entirely automatic it is not dependent on the motorman for operation at its greatest efficiency. Owing to its retaining mechanism the car, when the current is cut off and the brake applied, will remain standing on any grade until the motorman turns the handle to "release" position. The position of the power or reverse handle does not affect the operation of this brake in any way.

The brake-shoe pressure varies in correct proportion with the speed to get the maximum retardation obtainable by the friction between car wheels and rails. An inspection of the wheels on the testing car after using this brake on it two months failed to show any signs of flat-wheel trouble. The makers also state they have found that brake-shoe adjustment is reduced to a minimum.

It will be seen, by reference by the accompanying diagram, that the braking apparatus under the car takes very little space. When installing this system it is not necessary to displace any braking equipment already on the car, the same brake-shoes and levers on the trucks being used as with the hand brake. The brake wiring is connected with the regular car wiring so as to make the running and braking apparatus completely interlocking. Some representative stops are presented in the following table:

REPRESENTATIVE STOPS

Miles Per Hour	Distance Run, in Feet	Equivalent Constant Rate of Retardation M. P. H. P. S.
28.4	141.5	4.2
24.4	117.5	3.7
19.0	89.0	3.0
12.0	31.0	3.52
7.75	16.0	2.83

This braking apparatus possesses few parts, is substantially built and operates almost noiselessly. On a recent trip many stops were made up and down grades at all speeds up to 33

miles an hour, and in every instance the car was quickly stopped without causing any appreciable shocks or jarring.

This brake can be adapted to all classes of electric railway service, including systems using multiple-unit control, and is arranged to go into action automatically on the rear section of a broken train.

RAPID SURVEYING ON THE SOUTHERN ILLINOIS

The Southern Illinois Electric Railway is one of the inter-urban electric routes which is pushing its way across the lower portion of that State. The engineers have recently completed the survey from Mt. Vernon to Belleville and the branch line from Irvington to Salem, and as the work was quickly and efficiently done, some particulars of it may be of interest especially to promoters of interurban electric railway projects.

The survey party consisted of a chief engineer, one transitman, two chainmen, one back flagman, one stake marker, two axemen, one leveler, one rodman, one topographer, one taping man, one teamster and one cook, also one team of good horses with a covered wagon. The party also had a team of horses and a surrey, which were found very useful, as the line was for the greater part of its length parallel or adjacent to public highways.

Excepting the chief engineer none of the party had ever been on a railroad survey before, consequently they had to be "broken in," but they were apt and willing, so that it was not much trouble to teach them their respective duties. The line had been "gone over" and approximately located before the survey began, so the chief engineer knew pretty well where he was going.

The party began July 6, at the Chicago & Eastern Illinois depot, which is on the east side of Mt. Vernon, Ill., and ran west, partly over highways and partly across fields and stubble to Boyd, 12 miles distant, which was reached in six days. The next Saturday night found them at Okawville 42 miles on the way, and at noon the following Saturday they were at Belleville, 67 miles. The party rested for a week, and the following Monday began at Irvington, and at noon the following Friday were at Salem, 23 miles.

The party put a stake in at every 100 ft., took levels over all the line and noted the topographical features, including the names of all property owners over whose land they passed. They also measured to the nearest section corners of every section line they crossed, so as to tie in their work to the land lines. As a rule, they followed the lines of population, and made it a point to cross farm lands on property lines, if possible, so as to avoid land damages arising from cutting farms diagonally. Observing all these conditions 90 miles of complete survey was accomplished in twenty-seven days.

The cost of the survey was as follows:

	Per Day
Chief engineer.....	\$5.00
Transitman	3.00
Leveler	2.50
Rodman	2.00
Team	2.50
All others (each).....	1.50

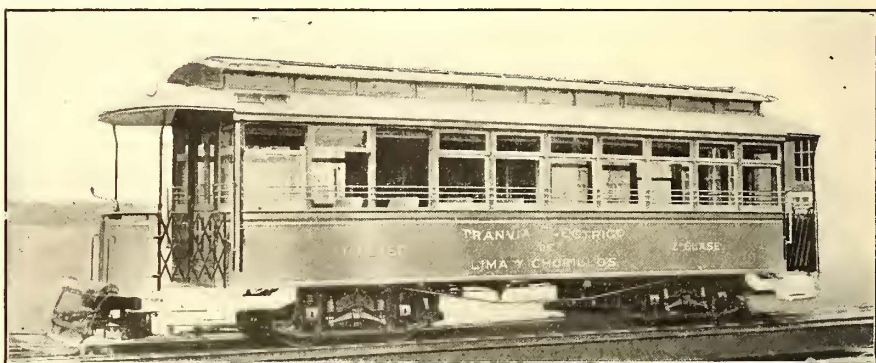
Adding to this maintenance, 50 cents per day per man and team, \$7, gave a total of \$38 per day, or \$1,026 for the field work of the survey, an average of \$11.40 per mile. This is, of course, a very low average per mile, and was only possible by a constant hustle of the party. On one day the party made 11 miles over the level lands between Sandoval and Salem, which, perhaps, comes close to the record for a preliminary survey.

When it came to plotting the notes very few errors were found. The level rodman checked the stake marker and "called

him down" on all his errors of numbering stakes. The levelman set bench marks every half mile, and pegged back to them so as to check his levels, and the transitman checked his deflections by needle readings of the compass, so the field work was thoroughly and carefully done. The party was in charge of Isaac A. Smith, chief engineer.

SEMI-CONVERTIBLES FOR SOUTH AMERICA

The advantages of semi-convertible cars for tropical countries are beginning to be appreciated, as is shown by the interest that has lately been manifested in this subject. This type of car is particularly adapted to service in countries where there are sudden and severe climatic changes, as it enables patrons to enjoy what is practically an open car when desired and yet furnishes shelter from rain and wind or sudden drop in temperature, such as these regions experience. The John Stephenson Company, of Elizabeth, N. J., is turning out several orders of this kind, including one of ten cars for the Lima-Chorillos Tramway Company, of Peru.



AMERICAN CARS FOR PERU

These cars differ materially in their interior arrangement from those employed on American railways. A partition extends across the center of the car dividing it equally into two compartments, one of which is for first-class passengers and the other for second class. The first-class compartment is finished in white ash with mahogany panels, and contains eight reversible seats. The second-class compartment is finished in dark ash with plain ash panels, which are uniform in color throughout and finished in a gloss. This part of the car has longitudinal seats, the backs of which are made of ash slats. In the center of the partitions is a sliding door finished with mahogany panels on the side facing the first-class compartment and in ash on the other side. There are double end doors opening on each platform.

These cars have 28-ft. bodies, are 8 ft. 4 ins. wide and 36 ft. over dashes. They will be mounted on Peckham trucks having a wheel base of 4 ft. 1 in., and will be equipped with two General Electric No. 57 railway motors.

The side sills and center sills are of yellow pine, and the flooring is of 1 1/8-in. yellow pine. The end sills and braces are of oak. The bolsters are framed into the body so that only a single step is required. Each end of the car has an open platform 4 ft. long.

As will be appreciated from the accompanying illustration, the car is of handsome design with a monitor roof, the formation of which is not affected by the pockets for the storage of the upper sashes. The semi-convertible feature is that adopted by the John Stephenson Company.

It is stated that the Law and Order League of Brooklyn is to be chartered. It was organized to protect defenseless women and children from the insults of the rowdies who frequent the beaches and amusement resorts in summer. Each member is provided with a deputy sheriff's badge and revolver.

FINANCIAL INTELLIGENCE

WALL STREET, Sept. 16, 1903.

The Money Market

Matters in the money market are taking the course they usually do at this season. Certain salient points of difference stand forth when the situation is compared with a year ago. Borrowings from Europe have been paid off extensively, and bank loans, outside of the local clearing-house institutions, have undoubtedly decreased. But in its routine features the money movement bids fair to follow a close parallel with previous years. Currency demands from the West and South, already begun in a small way, will continue for another six weeks or two months at the least to draw down New York's cash supply. The Treasury, partly by reason of heavy payments for customs, is a large creditor also upon the local institutions, and under our present financial system will most likely continue to press its claims for some time further. Another cause regularly present at this season contributes toward the diminution of the available surplus reserve. This is the withdrawal of funds which interior banks have been lending in the New York market, and which are now needed for crop-moving purposes. The practical effect is, of course, that the clearing-house banks of this city in supplying a substitute for these interior credits, increase their own liabilities and consequently decrease the margin of the legal surplus. Saturday's bank statement, like those of the preceding weeks, showed the workings of these several factors in another addition to that loan account, in another decrease in cash holdings, and in further lowering of the available reserve. It is true that the present surplus of \$17,000,000 compares with barely any surplus at all at this time last year, and is far above the average for the period. Yet this circumstance appears to mean, under the present circumstances, that exhaustion of lendable capital is only a question of a somewhat longer time than usual. The promise of the Secretary of the Treasury to increase government deposits holds good, but it is obviously meant to apply only after a real money stringency has become imminent. It must, therefore, be left out of the reckoning in all immediate calculations. As for the prospect of relief through gold imports, the latest developments in the foreign money markets show this to be an increasingly uncertain dependence. Sterling exchange is lower now than it was a week ago; it may decline further if the movement of grain and cotton enlarges in the manner hoped for and expected. But, on the other hand, the markets abroad are engaged in a keen competition for the surplus gold supply. London discounts under the manipulation of the Bank of England have risen sharply during the week. Money on the Continent is hardening in expectation that the Imperial Bank of Germany will raise its discount rate and make a strenuous effort to outbid the English market. Should this happen, as now seems probable, Paris would be the only logical source where American demands could be filled. Remembering from past experience the arbitrary measures which the Bank of France is apt to adopt when a call for gold is impending, help from this quarter must likewise be accounted as exceedingly doubtful. Our market must either raise its rates a good deal above the present, or it must be content to work out its own salvation without importing gold from the other side. These are the plain alternatives of the present situation. Meanwhile, in the absence of a new speculative demand, call money continues to rule at nominal figures on the local stock exchange, the prevailing quotation being 2 per cent to 2½ per cent. Time money is unchanged at 4½ per cent for sixty days, and 5½ per cent from five to six months.

The Stock Market

After another period of dullness lasting up to the close of last week, dealings on the stock exchange have become more active again. The activity, however, as Wall Street writers are fond of putting it, has occurred at the "expense of values." A partial recovery yesterday afternoon took away somewhat from the unpleasant impression left by Monday's really severe declines. Nevertheless the market is disposed to consider rather seriously again the question whether another interval of liquidation is not confronting it. Ostensibly prices broke the day before yesterday because of alarming reports of frost in the corn belt, and recovered yesterday when these reports proved to be unfounded. Still, it may be doubted whether the real trouble, after all, lay in misgivings owing to the crop outlook. The season, of course, is very

late, and in the remaining two or three weeks before harvest, frosts have an opportunity to work a great deal of harm. But against this must be set the truly remarkable estimates on the corn crop made by the government in last Thursday's report for September. The government figures show that on the first of the present month corn promised to yield between 2,250,000,000 and 2,300,000,000 bushels, which would make it the third, if not the second, largest crop on record. No one expects this promise to be realized, owing to the lateness of the season, but there is a very liberal margin for frost damage to occur and still leave an average crop. It seems to many thoughtful observers that the crop uncertainties are only one of a number of influences in the latest disturbance in the stock market. The difficulties and limitations already pointed out in the money situation are quite as important, if not a more important cause. So, too, are the evidences of mysterious but persistent liquidation going on in many quarters of the market. The suspicion naturally arises in view of the summer's experiences that this special selling may represent further unloading of marketable securities on the part of capitalists, who are called upon to meet syndicate obligations of one sort or another. This, perhaps, is the most disquieting possibility in the immediate market situation, because it means that securities are being sold regardless of their merits, and consequently that prices may be forced down below intrinsic values. As yet investment buying is discouragingly small. Capital is timid at home; abroad it is perplexed by the new uncertainties which have arisen within the last month in the foreign money and political situations. Our market can hardly count for such ready assistance from foreign investment purchases as it received during the trying days of July and August. The best face that can be put upon existing conditions is that stocks have passed into more secure hands than held them two months ago, and that this, with the low level of prices, should make any further liquidation a less unpleasant matter than it has been on former occasions this year.

Brooklyn Rapid Transit has attracted the most attention among the local traction stocks during the past week. It sold on Monday at the lowest price recorded since the spring of 1898. This movement, occurring simultaneously with the publication of the annual earnings report of the company, has been ascribed to a feeling of disappointment that the property is making no faster progress toward a dividend-paying basis. Although surplus earnings increased \$756,000 during the year, it is pointed out that the great proportion of the gain fell within the first six months, and that the record of the last six months failed to bear out previous promises. Attention has also been given to the prospect that more bonds will have to be sold before the extensive improvements now under way on the system are completed. But whether or not these are the entire influences at work, there has certainly been some heavy liquidation of important speculative holdings in the stock. The other traction stocks have declined in sympathy with the rest of the market, but have shown no particular weakness.

Philadelphia

In the absence of anything really important in the Philadelphia traction stocks, the speculative community tried to make a stir over the supposed reconciliation of two well-known street railway magnates who some time ago had a falling out. These gentlemen, at a friendly luncheon, were supposed to have buried the hatchet, and out of this circumstance ingenious gossip wove an interesting story of how some new and great plans had been set on foot by which all the local traction companies were duly to benefit. The story served to break into the monotony of a tedious week, causing some fractional advances among the leading shares. Union Traction advanced from 43½ to 44¼, and Philadelphia Traction from 96 to 96½. Even this little spark of life soon flickered out, however, and business came to a standstill again. Philadelphia Company common stock has shown the effects of moderate liquidation, declining from 40½ to 39; the preferred remained stationary at 43¾. Other transactions for the week were confined to scattering lots of American Railways at 45, Chicago Union Traction at 5½, New Jersey Consolidated from 60 to 61, and Union Passenger Railway at 235.

Chicago

Everything has been very quiet in Chicago street railway circles during the past week. No new developments have taken place with regard to franchise matters, as far as can be learned, but it is expected both sides will have the matter up again within a short

time, and that all concerned are about ready to come to some sort of agreement. Prices of the various securities have changed very little, and transactions for the week have been too small to have any significance. City Railway sold at 177, and later at 175, ex-dividend. A small lot of Metropolitan Elevated common sold at 21, then the price broke to 19, the lowest of the year. The preferred also reached a new low record at 57½. Northwestern Elevated sold at 20, South Side from 96½ to 96, and Lake Street at 6½.

Other Traction Securities

The feature of the week in Boston has been renewed weakness in Massachusetts Electric securities. Both common and preferred sold down to almost the lowest prices of six weeks ago, the former going to 19¼, the latter to 78. No significance attaches to this decline, except as a part of the general market liquidation. Selling in both stocks was light. Scarcely anything has been done in Boston Elevated; a few sales were reported between 137 and 137½. West End common rose a point from 89½ to 90½, and one sale of the preferred occurred at 108. In Baltimore the only incident of note was the further decline in United Railway securities, the common stock selling down to 10%, the income bonds to 62¼, and the general mortgage 4s to 90½. All these represent very nearly the lowest prices for the season. A few sales were reported in Baltimore Traction 5s on a scale down from 104¾ to 104. This ended the week's dealings so far as traction securities were concerned. On the New York curb scarcely any week that we remember in recent years has contained so little of interest for holders of street railway securities. One hundred shares of Interborough Rapid Transit sold at 97, 300 New Orleans common sold at 10¾ and 10½, a few sales were made in the 4½ per cent bonds of the latter company from 82 to 81¼, and 100 shares of St. Louis Transit was reported yesterday at 17¾.

There was practically nothing doing on the Cincinnati exchange last week. The announcement that Cincinnati interest had gained control of the Cincinnati, Dayton & Toledo Traction Company caused that stock to make slight advance in the figures asked, but there were few sales; these were made at around 28 and 29. Detroit United sagged considerably and several hundred shares sold at between 68¾ and 70. Cincinnati Street Railway declined to 130, with a few small sales at 130½. Cincinnati, Dayton & Toledo bonds sold at 81½ for a small lot. Columbus, Delaware & Marion 5s and Mansfield Railway, Light & Power 5s held at 101.

On the Cleveland market, Northern Ohio Traction & Light led in the selling. It held at 18¼ during the greater part of the week, but selling orders developed late in the week with little buying to meet it. At the close of the week the price sagged to 17¾. There were several sales at 20 for delivery six months hence. In view of the fact that the earnings of this road are showing an increase of almost 50 per cent, the purchase at 20 for delivery six months hence is looked upon as a good one. Northern Texas Traction sold at 35 and 35¼, its high mark for the week previous being 34½. Cincinnati, Dayton & Toledo sold at 26¾, a decline of two points since it was announced that Cincinnati interests controlled the road. Western Ohio receipts sold for 15½, which was 1¼ below last sale. A small block of Aurora, Elgin & Chicago 5s receipts sold at 80.

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	
	Sept. 8	Sept. 15
American Railways	45	43½
Aurora, Elgin & Chicago	20	20
Boston Elevated	137	137
Brooklyn Rapid Transit	43¾	38¾
Chicago City	170	*170
Chicago Union Traction (common)	4½	5
Chicago Union Traction (preferred)	30	32
Cleveland Electric	a73	e9
Columbus (preferred)	100	—
Consolidated Traction of New Jersey	58	59
Consolidated Traction of New Jersey 5s.....	104¾	104¾
Detroit United	68¾	68
Elgin, Aurora & Southern	a42	a42
Lake Shore Electric	—	—
Lake Street Elevated	6	5¾
Manhattan Railway	134¾	133
Massachusetts Electric Cos. (common)	21½	20
Massachusetts Electric Cos. (preferred)	79	78

	Closing Bid	
	Sept. 8	Sept. 15
Metropolitan Elevated, Chicago (common).....	21	18
Metropolitan Elevated, Chicago (preferred)	59	55
Metropolitan Street	112½	113¾
New Orleans (common)	10%	10¼
New Orleans Railways (preferred)	31	30
North American	77%	75
Northern Ohio Traction & Light.....	18	17¾
Philadelphia Rapid Transit	13¾	13½
Philadelphia Traction	96	96¼
St. Louis Transit (common)	18¾	18
South Side Elevated (Chicago)	96¼	95
Syracuse Rapid Transit	—	a30%
Syracuse Rapid Transit (preferred).....	—	a76½
Third Avenue	110	108
Toledo Railway & Light	20	20
Twin City, Minneapolis (common)	93¼	91¾
Union Traction (Philadelphia)	43%	43%
United Railways, St. Louis (preferred)	67	68

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

Iron and Steel

No fresh cuts in pig iron have occurred since the date of our last writing. Prices, however, are between 25 cents and 50 cents a ton lower than they were on the first of the month, and about a dollar less than five weeks ago. A contributory explanation for the recent decline now appears in the regular monthly statistics compiled by the Iron Age. This authority reports that pig iron production increased some 27,400 tons in August, as compared with July, the increase being attributable to the blowing in of furnaces which had been shut down for some time previous on account of the Southern miners' strike. It is true that stocks of iron on hand have increased only moderately, indicating a very high rate of consumption. Still the fact of there being any over-production at all helps to explain the downward tendency of prices. In the higher branches of the trade the only developments during the week are a somewhat better inquiry for steel rails for next year's delivery, a larger volume of business in sheet steel, and the refusal of makers of steel bars to reduce their previous schedule of prices. Quotations are as follows: Bessemer pig iron \$17.35 per ton, Bessemer steel \$27, and steel rails \$28.

Metals

Quotations for the leading metals are as follows: Copper 13¾ to 13¾ cents, tin 27½ cents, lead 4¾ cents, spelter 6 cents.

LOW-FARE ORDINANCE PASSED IN CLEVELAND

The City Council has railroaded through the ordinance granting to Albert E. Green and associates the right to build an electric railway on Dennison Avenue. This is the first of the new grants for the People's Street Railway, which is supposed to be promoted by John B. Hoefgen, an understudy of Mayor Johnson. The rate of fare on the line is to be 3 cents, with tickets at the rate of five for 15 cents, nine for 25 cents, and forty-four for \$1. The city reserves the right to purchase the road whenever it is vested with the proper power. Work on the line must start within six months, and the line must be placed in operation within one year. As an alleged start on the construction of the line, two wagon loads of rails and a wagon load of ties have been dumped in front of the residence of a citizen who fought the project of placing a line on the street. The promoters state that at the present time an effort will be made to build only the line in question, instead of the eleven lines which were proposed a year ago, when Mayor Johnson's plans were frustrated by a change in the city government.

FRANCHISE RENEWAL ORDINANCE VETOED IN TOLEDO

Mayor Jones, of Toledo, has vetoed the ordinance granting a renewal of franchises to the Toledo Railways & Light Company. He assigned a large number of reasons for his veto, among them being that the city had no right to renew or extend a grant except on the expiration of the franchise. The ordinance provided for the sale of eight tickets for 25 cents, and universal transfers, and was one of the most liberal franchises, so far as the city is concerned, ever presented to a municipality. Had the Mayor signed the ordinance it would have been promptly turned down by the company, as it is claimed the company could not operate under it and pay interest on its bonds. As a matter of fact, the company is in excellent condition to continue business without a franchise extension, since but 18 per cent of its franchises expire within seven years, and no franchise expires before that time. The majority of its franchises have a much longer time to run.

THE ANNUAL REPORT OF THE BROOKLYN RAPID TRANSIT COMPANY

The annual report of the Brooklyn Rapid Transit Company for the year ending June 30, 1903, was made public Saturday, Sept. 12.

The detailed statement shows an increase in gross earnings of \$769,699, with an increase in net earnings of \$1,022,517. The increase in total income was \$1,047,964. The net income increased \$777,890, while the increase in the surplus was \$737,503. The earning capacity is not fully shown by the net income, however. In spite of the economical operation which resulted in curtailing unnecessary expenses in many directions, operating expenses were swollen by several unusual items. The cost of operation of power plants, which increased over \$418,000, includes \$109,337 paid for power rented, which item could hardly occur again in view of the completion of the company's new power plant. The coal strike was also responsible for \$283,979. These two items added to the income would give total income of nearly \$1,400,000, which would be more than 3 per cent of the outstanding capital stock of the company. Economy was introduced in many ways, equipment being fully maintained, although expenditures in that line were reduced nearly \$350,000. Damages and legal expenses, one of the heaviest items in the road's cost, were \$956,730, a decrease of \$138,015 as compared with 1902.

The operating statement, with the figures for 1902, follows:

	1903	1902
Gross earnings.....	\$13,280,321	\$12,510,622
Operating expenses.....	7,931,079	8,183,897
Net earnings.....	\$5,349,242	\$4,326,725
Other income.....	277,493	252,046
Total income.....	\$5,626,735	\$4,578,771
Taxes, fixed charges.....	4,661,857	4,475,450
Net income.....	\$964,878	\$103,321
Special appropriation.....	168,095	84,428
Surplus for year.....	\$796,783	\$18,893
Charged off.....	40,386
Surplus.....	\$756,397	\$18,893

A comparative detailed summary of operations follows:

	1903	1902
Gross earnings:		
Passenger.....	\$13,086,840	\$12,321,265
Freight, mail and express.....	75,658	64,902
Advertising.....	117,823	124,455
Total earnings from operation.....	\$13,280,321	\$12,510,622
Operating expenses:		
Maintenance of way and structure....	\$495,188	\$567,059
Maintenance of equipment.....	812,600	1,160,999
Operation of power plant (a).....	1,680,751	1,262,429
Operation of cars—trainmen's wages	2,542,214	2,605,330
Operation of cars—other expenses....	908,310	975,561
Damages and legal expenses.....	956,730	1,094,745
General expenses.....	535,286	517,774
Total operating expenses.....	\$7,931,079	\$8,183,897
Net earnings from operation.....	5,349,242	4,326,725
Income from other sources:		
Rent of land and buildings.....	\$81,877	\$67,963
Rent of tracks and structure.....	99,054	99,051
Miscellaneous.....	96,562	85,032
Total income.....	\$5,626,735	\$4,578,771
Deductions:		
Taxes (b).....	\$757,789	\$742,817
Interest and rentals—net.....	3,904,068	3,732,633
Total deductions.....	\$4,661,857	\$4,475,450
Net income.....	\$964,878	\$103,321
Special appropriations.....	168,095	84,428
Surplus for the year.....	\$796,783	\$18,893
Sundry accounts from previous years charged off.....	40,386
Balance to credit of surplus.....	\$756,397	\$18,893

(a) Included in the cost of "operation of power plant" is \$109,337 paid for hired power, and \$283,979 increase in the cost of coal due to the coal strike.

(b) Included in taxes is \$16,931 paid under protest and now in litigation.

The general balance sheet as of June 30 shows:

ASSETS	
Cost of road, equipment, etc., of properties owned in whole or in part by the Brooklyn Rapid Transit Company....	\$92,488,400
Advances—Account, construction for leased companies.....	10,361,578
Brooklyn City Railroad Company..	\$5,479,787
Nassau Electric Railroad Company.	1,948,930
Prospect Park & Coney Island Railroad Company.....	214,574
Brooklyn Union Elevated Railroad Company.....	1,681,267
Additions and betterments not yet distributed.....	1,037,019
Guaranty fund (securities and cash)....	4,005,755
Total permanent investments.....	\$106,855,733
Current assets.....	1,842,620
Cash on hand.....	598,721
Due from companies and individuals.....	185,275
Material and supplies on hand.....	416,547
Prepaid accounts.....	386,849
Bonds and stock in treasury.....	255,228
Accounts to be adjusted.....	16,187
Total assets.....	\$108,714,540
LIABILITIES	
Capital stock.....	\$45,985,655
Brooklyn Rapid Transit Company..	\$45,000,000
Outstanding capital stock underlying companies.....	985,655
Bonded debt and real estate mortgages..	57,861,140
Brooklyn Rapid Transit Company..	12,000,000
Bonded debt of constituent companies:	
The Brooklyn Heights Railroad Company.....	250,000
Sea Beach Railway Company.....	650,000
Brooklyn, Queens County & Suburban Railroad Company.....	6,624,000
Nassau Electric Railroad Company.	15,000,000
Brooklyn Union Elevated Railroad Company.....	23,000,000
Real estate mortgages.....	337,140
Total capital stock, bonded debt and real estate mortgage.....	\$103,846,795
Current liabilities.....	3,119,995
Audited vouchers.....	\$1,041,799
Due companies and individuals.....	53,665
Taxes accrued and not due.....	1,095,974
Interest and rentals accrued and not due.....	866,386
Interest accrued on real estate mortgages and not due.....	4,700
Sundry charges accrued.....	9,381
Insurance.....	48,000
Surplus account—balance.....	1,747,840
Total liabilities.....	\$108,714,540

The report says that substantial additions to and improvements of the properties were made during the year. There were added to car equipment 120 open elevated cars, 16 open surface cars, 34 combination surface cars, 10 freight gondola cars and 2 snow-plows. The new central power station is progressing toward completion and is expected to be fully in operation with its equipment of eight 4000-hp engines in the spring of 1904. Four of the eight engines are in service and work is generally well advanced, with the exception of boiler and steam-fitting work, which is much behind the time set for completion. There were installed and are in operation in the eastern power station one new 4000-hp engine, with 2700-kw generator, and at various sub-stations six 1000-kw rotary converters and eighteen static transformers.

REPORT OF NEW ORLEANS RAILWAYS COMPANY FOR SIX MONTHS

The report of the New Orleans Railways Company for the six months ending June 30, 1903, which was noted in the STREET RAILWAY JOURNAL of Sept. 5, as being in preparation, has just been issued. It gives the income, charges and surplus of the company, details the earnings of the constituent companies, details the holdings of stock by the new company, and touches on the betterments and improvements that have been made. Figures are also given of unexpected extra charges that the company was called upon to meet.

The result of the operations of the company, also of the constituent companies, follows:

NEW ORLEANS COMPANY

Income—	
Dividends, interest and undivided surplus on account of securities of constituent companies owned by the Railway Company.....	\$424,229
Charges—	
Taxes	\$3,705
General expenses.....	9,595
Interest on bonds.....	400,703
Total	\$414,003
Surplus for six months.....	\$10,226

on the stock of the Gas Light Company. The Railways Company owns all the stock of the lighting company.

OUTSTANDING STOCKS AND BONDS OF THE NEW ORLEANS RAILWAYS COMPANY, AS OF JULY 1, 1903

Common stock	\$27,588,900
Preferred stock.....	8,792,400
Four and one-half (4½) per cent bonds.....	17,809,000

In connection with the above statement of the income, operating expenses and interest charges of the company, special attention is called to the fact that while over \$240,000 has been expended on the New Orleans & Pontchartrain Railroad, the railroad is still in process of construction, so that the company has received no appreciable income or benefit from the money expended.

Since the organization of the company there has been expended approximately \$1,500,000 in betterments and improvements to the various properties, from which the expected benefits are only now commencing to be realized. In the electric light and power department one unit of 1050-kw capacity has been installed complete, and a second unit of 1000-kw capacity is expected to be brought into operation by the end of this month, thus increasing the capacity of this plant from 3200 kw to 5250 kw, an increase of 64 per cent. In the new power house a new 1500-kw unit was put into operation February, 1903. A second new unit of 2250-kw capacity is expected to be installed, ready for operation about Dec. 1, 1903, and a third new unit of 2250 kw, now under order, is expected to be installed, ready for operation in time for use during the Mardi Gras season of 1904, making a total of 6000 kw of new

COMPARATIVE STATEMENT OF CONSTITUENT COMPANIES

	GROSS EARNINGS		OPERATING EXPENSES		NET EARNINGS		TAXES AND LICENSES AND OTHER DEDUCTIONS		BOND INTEREST		SURPLUS	
	1903	1902	1903	1902	1903	1902	1903	1902	1903	1902	1903	1902
N. O. Railways Co., Lessee.....	\$832,288	\$801,967	\$492,295	\$481,609	\$339,993	\$320,357	\$70,540	\$58,891	\$146,970	\$149,592	\$122,483	\$111,873
N. O. & C. R. R. L. & P. Co.:												
Railroad Department.....	390,850	402,558	206,120	206,921	184,730	195,637	35,395	31,541	74,695	75,145	74,640	88,950
Electric Department.....	396,795	375,347	195,094	161,668	201,700	213,678	34,799	17,203	70,000	70,000	96,901	126,474
St. Charles St. R. R. Co.....	179,722	166,019	108,514	105,342	71,298	60,677	14,534	9,556	7,500	6,000	49,174	45,121
Orleans Railroad Co.....	65,387	63,701	44,701	44,718	20,687	18,984	5,343	4,504	12,000	12,000	3,344	2,479
N. O. Lighting Co., Lessee.....	323,363	300,084	118,108	128,405	175,194	171,679	31,290	33,056	*1,900	*1,900	142,004	136,723
	\$2,188,345	\$2,109,676	\$1,194,832	\$1,128,663	\$933,512	\$981,012	\$191,901	\$154,751	\$313,065	\$314,637	\$188,546	\$511,628

* Not including the interest on the New Orleans Lighting Company's bonds, the most of which are already owned by the Railways Company, and all of which are provided for in the plan of consolidation

The New Orleans & Pontchartrain Railway Company is still in process of construction and is expected to be completed some time during the coming fall. The Railway Company has already expended on account of this road \$243,938.

The Railways Company now owns (as of July 1, 1903) the following stocks of the constituent companies:

NAME OF COMPANY.	Shares Outstanding	Shares Owned by Railways Company	Per Cent. Owned
New Orleans City R.R. Co.:			
Preferred stock.....	24,995	24,044	96
Common stock.....	49,792	47,308	95
Orleans Railroad Company.....	4,694	4,694	100
New Orleans & Carrollton L. and P. Co.:			
Preferred stock.....	46,000	45,112	99
Common stock.....	25,000	24,916½	99
St. Charles Street Railroad Co.....	9,533	9,359½	98
New Orleans Gas Light Company.....	37,500	14,579	*39
New Orleans Lighting Company.....	20,000	20,000	100

* In addition to the stock of New Orleans Gas Light Company owned, the Railways Company also has an option on 20,212 shares, making a total of 93 per cent. owned and under option.

Since July 1, 1903, the company has acquired in addition to the stocks mentioned above:

- 110 shares New Orleans City Railroad Company preferred stock.
- 187 shares New Orleans City Railroad Company common stock.
- 568 shares New Orleans & Carrollton Railroad, Light & Power Company preferred stock.
- 33¾ shares New Orleans & Carrollton Railroad, Light & Power Company common stock.
- 17 shares St. Charles Street Railroad Company stock.

The company also owns all the stock rights of the New Orleans & Pontchartrain Railroad Company.

The company, in addition to the ownership of the stocks, as above mentioned, of the New Orleans City Railroad Company, also has a lease of the properties of said company, and is, therefore, entitled to all surplus earnings of said company over and above the guaranteed dividends.

The New Orleans Gas Light Company is leased to the New Orleans Lighting Company on a guaranteed dividend of 6 per

and most modern electric equipment installed in the new power house. Upon the completion of these new units, operated with the present boiler plant, it is expected that there will be an annual net saving in cost of operation of more than \$20,000, due to economies to be obtained by shutting down several of the plants now operated under adverse conditions as to location and apparatus. With the installation of a proposed new boiler plant, the estimated annual saving will amount to approximately \$60,000.

For the purpose of increasing the output of the gas company the price of gas for both light and fuel was, on May 1, 1902, reduced to \$1.25 per 1000 cu. ft. Previously it had been \$1.75 per 1000 cu. ft. for lighting gas and \$1.25 for fuel gas. The company, in order to take care of the increased demand under the reduced price, has expended for extensions, betterments and improvements about \$300,000. The reduction in the price of gas has, as anticipated, stimulated the consumption, the amount of gas sold in the six months ending June 30, 1903, having been 258,300,000 cu. ft., as compared with 203,900,000 cu. ft. in the corresponding period last year, an increase of 26.6 per cent, thus fully justifying the reduction in price.

During the past six months the company has been called upon to meet large unexpected charges and diminution of income, which are approximately as follows:

Increase in taxes for six months.....	\$40,507
Increase in operating expenses, due to increase in wages of motormen and conductors.....	37,944
Increased cost of fuel.....	45,588
Reduction in price for municipal lighting.....	26,473
Total	\$150,512

Henry A. Everett's new private car, the "Josephine," which was described in a recent issue of the STREET RAILWAY JOURNAL, has been delivered in Cleveland. It was given a trial spin over the Cleveland, Painesville & Eastern Railway a few days ago.

THE BIG TRACTIONS

The "Wall Street Journal" recently presented some interesting comparisons of the operating results of the street railway companies in New York, Philadelphia, Boston, Brooklyn and Chicago. Results for the fiscal year ending in 1903 not being available, recourse was had to the fiscal year 1902, for the purpose of comparison. The figures of the Metropolitan Company, of New York, comprise three months of the Interurban Company, and nine months of the old Metropolitan Street Railway Company. Metropolitan Securities, despite the competition of Manhattan Elevated, shows the largest gross earnings, and Philadelphia Rapid Transit comes second, with Brooklyn Rapid Transit a close third. Boston Elevated, which operates 395 miles of surface road, under the name of the West End Street Railway, and about 16 miles of elevated road, stands in the same class, with earnings running upward of \$11,500,000. Chicago Union Traction does not include the elevated lines of that city, and, although Chicago is the second largest city in the country, this company comes fifth in point of gross earnings. Pittsburg would naturally, perhaps, be the sixth city to include in this comparison, but any such comparison is impracticable from the fact that the separate trolley operations are covered up, being combined with the gas business in the Philadelphia Company's report. Baltimore United Railways & Electric, in a comparatively small city, does within \$3,000,000 of the amount of gross business done by Chicago Union Traction.

The comparison of earnings follows:

Fiscal year 1902.	Phila. R. T.	Met. S. N. Y.	B. R. T.
Track mileage	475	196	522
Gross earnings	\$13,969,232	\$14,501,568	\$12,321,265
Operating expenses.....	6,402,338	6,739,275	8,952,214
Nct	\$7,566,894	\$7,762,293	\$3,369,051
Total income	*7,715,820	8,343,962	3,835,954
Fixed charges	7,597,780	†8,281,940	3,732,633
Surplus	\$118,040	\$62,022	\$103,321
Capital stock	‡\$6,000,000	‡\$15,000,000	\$45,000,000
Earn. per share stock....	\$0.19	\$0.20	\$0.23
Present market price.....	\$14	\$27 (77%)	\$45
	Chicago U. T.	Boston Elev.	Balt. U. R.
Mileage	486	409	363
Gross earnings	\$7,825,119	\$11,321,030	\$5,041,275
Operating expenses	4,570,719	7,862,572	2,252,133
Net	\$3,254,400	\$3,458,458	\$2,789,142
Total income	3,371,750	3,458,458	2,789,142
Fixed charges	3,619,278	2,836,560	a 2,637,115
Surplus	def. \$247,528	\$621,898	\$152,027
Capital stock common			
and preferred	\$32,000,000	\$13,300,000	\$15,069,308
Earn. per share stock....	\$0.00	\$4.67	\$0.50
Present market price stk.	b\$5	\$138	*\$11

*Includes present Union Traction rental of \$900,000 per annum and \$60,000 interest on Hestonville collateral trust 4s.

†Includes 7 per cent guarantee on Metropolitan Street Railway stock.

‡Cash paid in; assessable up to \$30,000,000.

a Includes preferred dividend.

b Common.

Philadelphia Rapid Transit for the 1903 fiscal year will show about \$15,400,000 gross and about \$400,000 surplus, or 66 cents per share for the stock as against \$118,040 for the latter item shown in the table above. Metropolitan, Brooklyn Rapid Transit, and Boston Elevated will probably report increases, though scarcely as large as those of Philadelphia Rapid Transit. Chicago Union Traction earned about \$8,000,000 and made, it is said, about \$250,000, or substantially the same as in 1902.

With its relatively lesser net earning power on the amount of gross business done, Brooklyn carries much tighter fixed charges than Metropolitan or Philadelphia Rapid Transit, and with \$1,000,000 more gross business than Boston Elevated the fixed charges are only about \$300,000 larger. Thus it is that Brooklyn is able to earn a surplus, although its operating expense item is from \$2,000,000 to \$2,500,000 higher than that of Philadelphia Rapid Transit or Metropolitan.

Metropolitan, of the larger roads, bears the heaviest fixed charges in proportion to gross business, and the operating results suggest at present a narrow margin of earnings over the 7 per cent guarantee.

Boston Elevated has the lightest capitalization based on gross earnings, hence its ability to pay dividends of 6 per cent and to have its stock sell at a handsome premium, while classed as an investment dividend-paying stock.

OUTING OF BROOKLYN STREET RAILWAY MEN

On Sept. 14, 15, 16, 17 and 18 a seaside festival was given at Luna Park, Coney Island, in aid of the Brooklyn Rapid Transit Employees' Sick and Death Benefit Association. A percentage of the returns from the sale of tickets, which were on sale by all of the Brooklyn Rapid Transit Company's employees, went to swell the coffers of the treasury, which is in readiness for the wives and children of those members needing assistance in time of sickness or distress. What greatly helped the sale of these tickets was the fact that the outing occurred during the entire week of Sept. 14, up to and including Friday, combining with a number of the principal attractions the special features arranged for the Indian Summer Carnivals which began on Labor Day, to continue until Oct. 1. Two kinds of tickets were sold, one for 50 cents and the other for 25 cents. For 50 cents the holder was entitled to admission to Luna Park, "A Trip to the Moon," "20,000 Leagues Under the Sea" and to Hagenbeek's Trained Wild Animal Show, which, under ordinary circumstances, would cost 85 cents, without considering the extra Indian Summer Carnival features. Twenty-five cents included admission to the Park, a ride on the Chute the Chutes, the Old Mill, the Laughing Mirrors and the Midnight Express, the total cost of which is usually 40 cents.

The carnival was in charge of the following members of the Association, who constituted the arrangement committee: George Wolfram, D. S. Smith, G. W. Edwards, D. R. Collin, H. Pistor E. Gilchrist, T. Moylett, C. E. Rochl, J. M. Dudley. This committee is to award prizes to all who sell fifty or more tickets. Much of the success enjoyed was due to the conscientious work of the committee and to the liberal reduction in price made by the owners of Luna Park.

PLAN TO CONNECT NEW YORK'S BRIDGES

Mayor Low, of New York, has made public a letter from Bridge Commissioner Lindenthal containing recommendations for the connection of the four bridges over the East River with the transportation companies on both sides of the East River. The Mayor said that he would submit the letter to the Rapid Transit Commissioners. Mr. Lindenthal says that the Brooklyn Bridge was constructed before the present demands upon the structure were foreseen, and for that reason he is of the opinion that the floor system of the bridge must be replaced so that there will be separate decks for the trolley tracks and for the elevated railway tracks. This will require a general strengthening of the structure, which is not now adequate to carry much more weight.

He added that provision will be made in the plan of the new City Hall station for a loop terminal, with a space of 40 ft. between each loop, that will probably give ample room for all the trolley cars of the future. He also wishes to remove the present elevated terminal structure in Brooklyn and use the cleared space for a park. He proposes an extension of the elevated lines over the Brooklyn Bridge, along Park Row and Division Street, which will allow the construction of a loop between the new Manhattan and the Brooklyn Bridge.

Mr. Lindenthal suggest that the Second Avenue elevated structure in Manhattan be removed and deflected from Delancey Street into the Bowery. The Williamsburg bridge will have six tracks, two in the middle for the elevated road, and two on each side for the trolley lines. The elevated trains from Brooklyn, in reaching the Elm Street station, will have to cross over the tracks of the Manhattan Elevated road at Allen Street and the Bowery, and the Brooklyn roads will have their Manhattan ends within two blocks of Broadway.

The Elm Street Station, Mr. Lindenthal says, should have four tracks and five platforms, which would permit the separation of incoming and outgoing passengers. One six-car train, he says, could depart from the station every sixty seconds, which means a seating capacity for 15,000 passengers and 15,000 standing passengers every hour. It would also transfer passengers from Brooklyn and Williamsburg to the subway at this point and to the Manhattan Elevated Railway trains, both north and south.

The southern two blocks on the Williamsburg bridge, Mr. Lindenthal says, can be used for the moving platform. This moving platform would descend on a 12 per cent grade into a subway in Manhattan under Delancey Street to the Bowery, to Park Row, to Nassau Street, according to the plan now before the Rapid Transit Commission. The Commissioner believes that the moving platform, with a capacity of 70,000 passengers per hour, should suffice for the traffic between lower Manhattan and Williamsburg for a long time to come. Mr. Lindenthal concluded by reviewing his plans for the Blackwell's Island bridge.

PROGRAMME OF THE VIENNA MEETING OF THE INTERNATIONAL TRAMWAYS AND LIGHT RAILWAYS UNION

The list of papers and questions to be followed at the next convention of the Union Internationale de Tramways et de Chemins der fer d'Intérêt local (Internationaler Strassenbahn-und Kleinbahn-Verein), has just been issued by the secretary. This meeting is to be held in Vienna some time during the first two weeks of September, 1904. The exact date is to be announced later. The subjects to be discussed and the questions which each member-company of the association is requested to answer before October 30, 1903, are given below. Replies to these questions should be sent directly to the secretary of the association at Brussels, and will be referred by him to the member who has been selected to present a report on each topic.

(1) RENEWAL ACCOUNTS.

1. Do you have a regular renewal account independent of the operation, repair and sinking fund accounts, to cover the renewal of your equipment? The purpose of this fund is based on the theory that a large part of the equipment of a street railway undergoes a certain depreciation, which, independent of repairs, makes it antiquated and requires its renewal one or more times before the expiration of the franchise.

2. Is the establishment of such a renewal fund prescribed either by law or by the charter or by-laws of your company? If in the affirmative, what are the regulations?

3. Upon what should the payments to such a renewal account be based, in your opinion? Is it desirable to divide it into the following sub-divisions: (a) track construction, (b) rolling stock and equipment, (c) buildings and structures, (d) power station and equipment, (e) overhead lines and feeder conduits, (f) other parts of the equipment which are subject to deterioration?

4. What is the total amount of the sum charged to this account annually in each of the different sub-divisions?

5. Are these different accounts credited with the sums realized from the sale of old material, or are these credits carried into the receipts from operation?

6. What expenses in repairs and renewals from the standpoint of their importance do you charge into ordinary operating expenses instead of against the renewal account? If you have a limit, how is it fixed?

(2) TRANSFER TICKETS.

1. Do you use transfer tickets?

2. Are they valid on your own line only or do you transfer with other lines?

3. What are your fares with and without transfers?

4. Have you introduced the system of transfers of your own volition or have they been required by the authorities?

5. Give the results of the use of transfers, and the reasons for any opinions you may express in regard to it.

6. What methods do you recommend for preventing the abuse of transfer tickets?

7. Do you, to avoid fraud, differentiate the tickets in any way, or do you employ some other method of checking? In this connection please send one of your tickets and indicate the identification marking.

8. Has the system which you employ of preventing frauds given satisfactory results?

9. Does this system cost more than the frauds which it is intended to prevent?

10. What amount, in percentage of your receipts, do you estimate as the loss from frauds in connection with your transfer system?

(3) ECONOMY IN THE CONSUMPTION OF CURRENT BY CARS.

1. What is the gage of your tracks? Give the percentage of your lines on a grade of 0 to 1 per cent, from 1 per cent to 3 per cent, of 3 per cent to 5 per cent, of 5 per cent to 7 per cent, of 7 per cent to 9 per cent, above 9 per cent.

2. What is the maximum grade?

3. Give in percentages of the total length of your lines, the length on curves as follows: Curves up to 15 meters radius, between 15 and 20 meters radius, between 20 and 40 meters radius, between 40 and 60 meters radius, between 60 and 100 meters radius, curves of over 100 meters radius, and straight line.

4. What is the total length of your line?

5. What is the number and weight of the different types of motor cars used by you as follows: Single-truck cars, three-axle cars, double-truck cars?

6. What is the number and weight of your trail cars?

7. What is the average number of stops per kilometer of track?

8. Do you produce your own power or is it purchased?

9. How do you measure the consumption of current?

10. What make of wattmeters do you use?

11. Do you measure the current from a main wattmeter or by several wattmeters? Give a schematic diagram of the arrangement of the feeders and the position of the wattmeters. Also state how you determine any errors in reading these wattmeters.

12. Give the number during the last year of operation of car kilometers, number of car kilometers per kilometer of track, the number of motor car kilometers calculated on the basis of one trail-car kilometer equals one-third of a motor car kilometer; the actual number of motor car kilometers, and the number of tonne kilometers run.

13. Give the consumption of current per car kilometer as follows per motor per car kilometer calculated as above, per motor kilometer, actual, and per tonne kilometer.

14. Do you think the consumption of current, as determined in question 13, can be reduced?

15. Have you taken any steps to accomplish this? If so, indicate what you have done, and what results have been obtained.

16. Do you consider that, by a good course of technical instruction to the motorman, a material reduction can be made in the amount of current required to operate the cars? If so, in what direction should this instruction be given, and what would be its cost?

17. To what extent do you check up the consumption of current by motormen, either by inspectors or by individual wattmeters? What results have been obtained? What is the additional cost of operation?

18. Have you instituted any system by which the employees who are economical of current participate in the economy realized? If so, do the motormen alone participate, and what is the plan followed?

19. Have you attempted in employing wattmeters on your cars to determine the average consumption of cars of the same type on lines of the same class of traffic?

20. Who are the manufacturers of the wattmeters used on your cars? How many did you order, and what was the price?

21. Give your opinion as to their use.

22. How often are these wattmeters regulated or repaired? What troubles have you observed in them, and what errors have you noticed in their reading?

23. Where are the wattmeters mounted in the car?

24. How long have they been in use?

25. When and how often are these wattmeters read?

26. Who reads them?

27. Do the motormen receive prizes for economical use of current?

28. What percentage of the total number receive such prizes?

29. How often do you distribute such prizes?

30. How do you proceed to determine these prizes? If according to a certain scale, please give particulars.

31. What is the total cost of installing this system?

32. How much is the cost of maintenance and other expenses increased by its use?

33. How do you determine the saving realized by the company?

34. What proportion of this saving is given to the motorman, and what to the conductors?

35. Is the consumption of current constant for all lines and for the different types of cars?

36. If not, how do you determine the relative efficiency of the motorman?

37. How do you calculate the current taken by trail cars?

(4) BRAKES.

1. What system of brakes do you use for motor cars and for trains? Please indicate, in the case of trains, how the brakes on the trail cars are applied, and if they are operated by the motorman of the motor car.

2. Point out the advantages and disadvantages of the different types of brakes, especially compressed air, electric and electromagnetic.

3. Have you made any tests on brakes? If so, state what have been the results.

4. Give the cost of maintenance and renewal of brakes employed by the year and per car kilometer.

5. What are the weights of your motor cars and your trail cars?

6. What is the gage?

7. What is the percentage, in total length, of your line (on track) of the following grades: From 0 to 1 per cent, from 1 per cent to 3 per cent, from 3 per cent to 5 per cent, and above 5 per cent?

8. In case you have several systems of brakes, state which are for regular service and which are for emergency use.

N. B.—Also note the discussion relating to brakes at the meetings at Paris in 1900 and London in 1902, and also the re-

port presented to the 1902 convention by Mr. Poetz, chief engineer of the Hamburg Tramway Company.

(5) PROTECTION OF THE TROLLEY WIRE AGAINST ACCIDENTAL CONTACT WITH TELEPHONE AND OTHER AERIAL WIRES.

1. What system of protection of this kind do you employ?
2. Have you employed other systems? If any have been abandoned, give the reasons.
3. Is the system, which you are now using, one required by the authorities?
4. Is it satisfactory (a) for the object for which it is intended; that is, to prevent accidents, (b) from the standpoint of operation?
5. What is the cost of maintenance of this system, both per km of trolley wire and per motor car km?
6. Have you been obliged to install any safety precautions in the other aerial wires themselves, such as the introduction of a complete metallic circuit, fuses, etc.?
7. To what accounts have you charged these expenses?
8. What trolley system do you use; trolley wheels or trolley bows?

(6) OPERATION OF TRAIL CARS IN CITY SERVICE.

1. Under what conditions do you consider the operation of trail cars, in city service, desirable?
2. Do you operate trains composed of one or several trail cars? Are you permitted to employ any number of trail cars in a train? In case there are any restrictions, please state what these are, and for what reasons they were introduced.
3. To what extent does the operation of trail cars depend on the local conditions on your line, such as single or double track, and the intensity of the traffic? If your lines are single track, are trail cars sometimes desirable, and are you permitted to run them? If double track, give all the reasons which have led you to use trail cars, and the number of cars per train.
4. To what extent does the operation of trail cars on your system depend on the street traffic and on the length and character of the streets and squares?
5. To what extent does the braking of the trains depend upon the grades and other topographical conditions in the streets occupied by your lines? What system of braking do you employ, and is it satisfactory for trains?
6. To what extent is the employment of trail cars on your system determined by other local conditions, such as crossings and terminal facilities?
7. What is your opinion as to the relative advantages and disadvantages of trains composed of one motor car and one or more trail cars?

(7) ADVANTAGES AND DISADVANTAGES OF ELECTRIC TRACTION ON INTERURBAN RAILWAYS.

1. What, in general, are the advantages and disadvantages of electric traction on such lines?
2. Was electric traction originally installed on your line, or has it replaced steam traction?
3. What were your reasons for introducing electric traction?
4. Describe the influence of the length of your line in km, density of traffic, etc., on the position of your central station?
5. Give the amount of traffic and freight carried per kilometer of track and per year.
6. Are your tracks standard or narrow gage?
7. What gage would you recommend when electric traction is used, and give your reasons?
8. Does your operation include trains composed exclusively of passenger trains, or of freight trains, or of mixed trains; that is to say, are the trains ever made up of both passenger and freight cars?
9. Describe the composition of trains made up, giving number of cars, weight empty and loaded, average speed, whether drawn by special locomotives or motor cars.
10. What is the expense of operation per train kilometer and per tonne kilometer? In making up this report kindly employ the standard system of accounting adopted at London in 1902.
11. Give the average price, per ton, of coal delivered, and the average wages of the employees.
12. Would you recommend any changes in your equipment as it exists to-day?

(8) CHARACTER OF CURRENT FOR INTERURBAN LINES.

1. What is the most desirable character of current to use on interurban lines whose length does not permit the use of direct current from one central station? Divide this answer according to the following points: (1) Cost of transportation of power, (2) installation of transmission lines and the apparatus for taking the current, (3) the motors and (4) the effect on other neighboring installations.
2. What limit of voltage should be used on the transmission line and in the cars?

(9) TRACK CONSTRUCTION FOR INTERURBAN STEAM LINES.

1. Give section of rails employed on your interurban lines.
2. What is the weight of your rail, per meter?
3. What joint do you use, and is it attached to the tie? Please give full description, with plans.
4. What guarantees do you require from the manufacturers of the rails?
5. State what ties are being used, viz., wood or metal, length, width, spacing, and spacing at joints.
6. State what ballast is being used.
7. Have you made any investigation into the relative merits of different kinds of ballasts? If in the affirmative, state what.
8. What is the weight of your locomotives and your trains, per axle? What is the admissible weight, per wheel, of your locomotive cars?
9. What is the average and maximum speed of your trains?
10. What are the advantages of different kinds of track construction, and what changes would you make if you were to rebuild your track?

(12) LEGISLATION ON TRAMWAYS AND INTERURBAN ROADS IN DIFFERENT COUNTRIES IN EUROPE

Communications relative to this subject in the different countries in Europe should be sent to the secretary, according to the plan suggested at the London meeting by Mr. R. H. Scotter.

(13) STANDARD FORM OF OPERATING REPORT.

Communications relative to the subject of the standard form of report adopted at the London meeting in 1902 are requested, as well as a copy of the report of each company made out on this basis. The members of the association are requested to indicate in what form they recommend the division of expenses between motor car kilometer and trail car kilometer; in other words, if they estimate the expense of trail car kilometers at one-half or one-third, or any other fraction, of a motor car kilometer.

N. B.—The operating expenses should be separated under the nine primary headings defined in the standard system of classification.

(14) CONTROL OF ELECTRICAL INSTALLATIONS AND MAINTENANCE OF TROLLEY WIRE

1. Have you established any system of inspection in regard to faults of insulation on your overhead system, or the stability of the trolley wire? If so, please give full information, especially on the following points:
 2. Describe the methods which you employ for testing the insulation of the system as a whole, measured from the switch board.
 3. Tests of insulation, individually, of the feeders, trolley wire and the return circuit.
 4. Measurement of the electrical resistance of the joints.
 5. Measurements of currents which would cause electrolysis.
 6. What importance do you attach to this inspection?
 7. After what periods do you consider it necessary to test the insulation of the line and track?
 8. Have you, in spite of this method of inspection, suffered important losses due to bad insulation of the line in general?
 9. Have you had any instances of trolley-wire breakage?
 10. What was the cause?
 11. What precautionary measures have you adopted in this respect?
 12. How often do you renew the trolley wire?
 13. Complete your reply by giving the following data: Profile of line, headway of cars at different hours of the day, form and section of the trolley wire, type of suspension used, length of spans and tension of wire at a degree cent; type of trolley, viz., center under-running trolley, Dickinson trolley, and bow.

(15) USE OF MOTOR CARS AND LOCOMOTIVES ON RAILWAY AND TRAMWAY LINES

Motor cars in this connection will be understood to be cars not sufficiently powerful to haul trailers; locomotives as cars capable of hauling one or more trailers.

1. Are you using motor cars, with steam, gas or electric power? If so, describe the system, gage of your tracks, the form of motor employed.
2. How many and what kind of locomotive are you using?
3. What kind of service do these cars supply? Are they used for passengers, post, freight or baggage service, or all together, or for one or more of them alone? Is this service carried on on tramway lines, or purely on lines which operate outside the city limits?
4. Do you divide the cars into classes? How many seated and how many standing? What is the capacity of the compartments reserved for baggage, and what for passenger service? What is the tonnage of the cars or locomotives used in freight business? What is the maximum speed, in kilometers, per hour? What is the maximum grade and minimum curve? What is the maximum

LONDON LETTER.

(From Our Regular Correspondent.)

weight, net and gross, which can be transported in or by these cars?

5. Do these cars have to be turned at the ends of the line?

6. When not operated as motor cars or locomotives, can they, without inconvenience, be used as ordinary cars, and be made up in trains?

7. How many employees are required to operate a train?

8. Give a description of these cars; in particular, their construction, wheels, motors, boiler, etc., principal dimensions, weight loaded, empty, the system of braking, method of lighting and heating, consumption of fuel per car kilometer, total expense per car kilometer, per train kilometer and per tonne kilometer. These expenses of operation should not include interest and sinking fund.

9. What are the average car kilometers and train kilometers run by these cars?

10. What is their initial cost?

11. If electric traction is used, indicate if it is by accumulators, trolley system or third rail.

12. If by accumulators, indicate the system, connections employed, number of cells, method of disposing the batteries in the car, the capacity of the batteries, the maximum run per charge.

13. What is the cost of current?

14. What changes would you recommend in the construction of your cars?

15. What are the advantages and disadvantages of a road of this character?

16. What other information can you give on this system of traction?

17. What are the results of your operation since you employed this type of car, especially from the standpoint of cost of operation and net receipts?

WHERE IS THE DISHONESTY?

Officials of the Pacific Electric Railway Company, of Los Angeles, Cal., are wondering whether the trainmen or the traveling public have the better opportunity to pilfer articles that are left on cars by passengers, and their conclusion is that far more unrecovered articles are wrongfully taken by passengers than by trainmen. The motorman and conductor, it is argued, have little time to note bundles left behind by passengers, while a dishonest passenger can readily take possession of property that is not his. Of course anything left in the car until the end of the trip falls into the hands of the trainmen, and then their honesty is on test.

Of late a large number of passengers walking away with packages or other property picked up in cars have been intercepted by officials of the road. To keep better tab on the trainmen the company hereafter will assign to one of its employees the duty of watching cars to gather up everything left behind by passengers. To each article that is found will be attached full particulars of when, where and by whom, and a duplicate of these particulars will be forwarded to the general manager's office. Then at the end of ninety days or six months all property not reclaimed will be sold at auction.

The "found" department of the Los Angeles Railway Company is worked on a different plan. All articles not reclaimed after a certain period are returned to the trainmen turning them in. It is argued, however, that the system may serve as an inducement to a trainman to keep back a "found" article until all inquiry about it has passed. Then when he turns it in he may be pretty sure that he will get it back again. In the case of valuable finds it is urged this might prove a serious temptation.

The Los Angeles Railway Company has cut down the number of passes, because the privileges restricted to policemen and firemen were abused. Badges were transferred, and scores of people were found to be enjoying free rides. Trainmen have been ordered not to honor fire department badges, and now men regularly employed in that department are furnished with pass books, which are renewable. Police stars are honored only when carried by the chief, the captain of police, captain of detectives, police sergeants with stars from one to eight, detectives with stars from one to twenty, and patrolmen with stars from one to one hundred and three. As heretofore, mail carriers, special delivery messengers from the postoffice, and the sanitary police continue to ride free, and, to show good faith in the matter, the management has issued free transportation to all municipal boards and commissions, including the Board of Library Trustees, the Civil Service Commissioners, the Park and Water Commissions, and the members of the Board of Education, to all of whom the courtesy has not heretofore been extended.

At the half-yearly meeting of the Metropolitan District Railway Company shareholders interesting figures were given, especially with relation to the probable adoption, after the electrification of the line, of a uniform fare of 2d., instead of the graduated fares with first, second and third-class, which prevail at present. The District Railway reduced its fares considerably about a year ago, but it would appear that if it decreases its rates very considerably for the short-distance runs round about London that its traffic would very largely increase. The company's first-class fares are very high when compared with bus competition, and especially with the tube competition. The difficulties of overcoming the various causes of the graduated fares have been great, though it is quite evident, from the apparent tenor of the remarks at the meeting, that a uniform fare will be adopted when electrical trains are placed in service. The electrification of the railway is proceeding most satisfactorily, and there are, at present, engaged on the work about 1000 men. The work, of course, is mainly done at night after the trains stop, so that very little of it is visible to the ordinary traveler. The large generating station is making excellent progress. The docks in which the barges will be received for delivering coal are also being rapidly completed, and the whole power house will soon be a very interesting place to visit. It is said that the turbines which are being made at Trafford Park are also making good progress.

Considerable excitement in tramway circles has recently existed in Leeds, where a warm discussion has been proceeding concerning the salary of J. B. Hamilton, general manager of the tramways. As is well known, Mr. Hamilton came from Glasgow about eighteen months ago, and has done remarkably well for Leeds since being established there; in fact, he has established such a reputation for himself that when Birmingham was in the throes of its negotiations with the British Electric Traction Company as to whether it should operate the tramways itself or lease them to the latter company, Mr. Hamilton was called in as an expert by the Corporation to advise it of the value of the tramways, and to give a report on the whole situation. Recently, Mr. Hamilton, who has been enjoying a salary in Leeds of £900, to be raised to £1,000 in two years, was offered by the Birmingham Corporation the position of general manager of its tramways, with a salary of £1,500 a year. Mr. Hamilton very promptly laid the whole matter before his committee, of which Councilor Smithson is the chairman, who strongly urged Mr. Hamilton to stay in Leeds, when they would recommend the council to advance his salary to £1,500 a year. With this understanding, Mr. Hamilton declined the invitation of the Birmingham Corporation, but the Leeds City Council has refused to ratify the agreement made by the tramways committee, and positively refuses to increase Mr. Hamilton's salary in any way. Following this action, on the part of the Council, Councilor Smithson, as chairman of the committee, has sent in his formal resignation, as it was strongly on his recommendation that the increased salary was promised, he being one of the few members of tramways committees who seem to appreciate what a good tramway manager is worth.

In moving the adoption of the tenth annual report, at a meeting of the Electric Construction Company, Ltd., J. W. Barclay said the net profit of £20,736 was the same as last year, and the dividend of 5 per cent was also the same, while the amount carried forward (£4,394) was somewhat larger. As to the new fiscal policy, it was said that its industry was doomed, if some change was not made. It survived in spite of competition, which was as strong as they need expect. The Germans had secured orders from some corporations who believed more in cheapness than quality, but it was the depression at home which had led the Germans to compete with us, and when trade improved in Germany he did not think there would be much to apprehend from German competition. Then, again, the American manufacturer did not seem to derive much advantage from the protection he enjoyed at home, because two of the largest electrical manufacturers in the United States had set up works in this country. P. E. Beachcroft seconded the adoption of the report, which was agreed to.

At the ordinary meeting of the Electrical Power Storage Company, Ltd., held at the offices, 4 Great Winchester street, J. I. Courtenay, who presided, moved the adoption of the report. He congratulated the shareholders on the position of the company, and said the directors felt justified, by the steady improvement in the business, in recommending an increase of 1 per cent in the dividend, making it 6 per cent, while continuing the cautious policy of again transferring £5,000 to reserve and £1,000 to con-

tingent fund. In addition to its usual business in smaller batteries for lighting and traction, it had completed, during the year under review, more than twenty large installations in connection with lighting and power stations in various parts of the Kingdom; and it had in course of erection, or on its books, at the beginning of the year, orders for thirteen similar installations. The competition had been quite as severe as in previous years, and the company had also had an American invasion, as the largest storage battery company on the other side of the water had acquired the controlling interest in one of the competing companies in this country.

During the past month the last horse car ceased to run on the Liverpool Corporation tramways. The route from which it was withdrawn is situated in Litherland, and is about a mile in length from Bridgeroad to the Bootle boundary at Linacreroad. This is now the only portion of the tramway system unelectrified, and the work of reconstruction will be carried out with all possible speed by the city engineer's department. Meanwhile, the locality in question will be devoid of tramway facilities. When this section is completed 106 miles of track will then have been transformed from horse haulage to electric traction since the municipality took control in 1898.

The report of the Dublin United Tramway Company (1896). Ltd., for the half-year ended June 30, last, states that the amount available for division is £36,882, out of which a dividend for the half-year is recommended at the rate of 5 per cent per annum on the ordinary shares, and a sum of £2,000 has been set aside to reserve fund, leaving £2,857 to be carried forward. The amount charged against revenue of the half-year for rates and taxes again shows an increase of £2,125, as compared with the corresponding period of 1902.

At one of the meetings of the Royal Commission, now sitting in London, to inquire into the question of London street traffic, Harry Edwin Haward, comptroller of the L. C. C., gave evidence with regard to the tube railway schemes in London. The capital involved in the tubes now in operation was £7,518,000. Of those in course of construction, the amount involved was £18,493,000, and of those authorized, but not commenced, the amount involved was £3,680,000. Of new railways, including the extension of existing ones, proposed by bills introduced into Parliament this session, the amount involved was £20,586,000, the whole giving a total capital in question of £50,257,000. J. Williams Benn, L.C.C., made the statement that there were, approximately, 15,000 tramcars and 4000 omnibuses running daily in London, carrying something like 17,000 passengers. The length of the horse tram was 35 ft. 6 ins., and of an omnibus, 20 ft. These vehicles would extend a distance of 27½ miles, and would carry 170,000 passengers, whereas an electric car carrying 65 passengers was only 35 ft. 6 ins. in length, and 2615 of these vehicles, covering only 16 1-3 miles, would be sufficient, in his opinion, to carry the same number of passengers which now took 5500 horse vehicles. There would thus be a saving, in the streets, of nearly 3000 vehicles. If they packed 5500 horse cars and omnibuses close together, an area of 24½ acres would be covered, whereas 2615 electric cars, carrying the same number of passengers, would only cover fourteen acres. Consequently, there would be a saving of street room of 10½ acres, without any prejudice to the public service, and relieving the streets of an immense amount of dirt.

At the last meeting of the electricity committee of the Accrington Town Council a letter was read from the secretary of the tramway company, asking for an interview with the committee to discuss matters with reference to possible arrangements as to a conversion of the tramways to electrical traction.

The annual report of the Glasgow Corporation Tramway to May 31 states that the result of the year's working shows that the revenue amounted to £656,572 and the working expenses, including depreciation, to £431,870, leaving a balance of £224,702. The revenue of the previous year was £614,413 and the working expenses, including depreciation, £405,103, leaving a balance of £209,310. This year's balance of £224,702 has been applied to meeting interest and sinking fund, etc., on cost of Govan and Ibox tramways; interest on capital, sinking fund, and annual payment to the common good, these payments amounting, in all, to £124,425. The net balance remaining amounts to £100,276, out of which an extra payment of £10,000 has been made to the common good. On account of the high rates prevailing for electrical material during the period of construction, £40,000 has been written off the cost of feeder cables and overhead equipment; £25,000 has also been written off the cost of buildings originally constructed for horse traction. The balance, amounting to £25,276, has been added to the general reserve fund.

The London County Council is anxious to proceed with the construction of a tramway extension on the electrical conduit system along Tottenham Courtroad, and it has again asked the

consent of the St. Pancras Borough Council as the road authority concerned. The latter has decided to adhere to its resolution only to sanction the scheme as part of the general plan of linking up the tramways of north and south of the Thames, via Charing-cross and Northumberland Avenue.

For some time past there has been a feeling among the members of the Sunderland Tramways Company that the electricity and lighting committee should allow it to have current at a cheaper rate. This view forced itself to the front recently, when the Corporation contemplated supplying electric power to manufacturers at less than the price paid by the tramways. The tramways committee applied for a reduction, and the matter was referred to the engineer, Mr. Snell. Mr. Snell has just issued a report on the subject, and suggests, upon the condition that coal does not increase in price during the period, that the charge to the tramways department should be reduced from 2d. per unit to 1½d. during the current year, which will make a difference in revenue to the electricity committee and a saving to the tramway department of £711. Mr. Snell also hopes to be able, from the first of March, 1904, to advise a further reduction to 1¼d.

The old-fashioned horse trams at Reading have been superseded by an extended service of electric trams. The routes embrace all the attractive suburbs of the town, including the favorite Thames-side resort of Caversham. The expenditure sanctioned was £214,000, and the route is about 7½ miles in length. The inauguration was signalized by a luncheon given in the town hall. The mayor presided, and was supported by Lords Saye and Sele, Sir Albert Rollit, M.P., Mr. George W. Palmer, M.P., and others.

Lowestoft Corporation has also inaugurated its electric tram undertaking, which has involved an outlay of some £80,000. Six and a half miles of track have been laid, and overhead equipment completed within the short period of three months, the contractors having been stimulated to expedition by the offer of a bonus of £1,500.

Mr. R. A. Chattuck, at present electrical engineer to the Bradford Corporation, has recently been appointed to a similar position with the Birmingham Corporation, which is about to electrify all of its existing tramway lines.

The first section of the Mid-Yorkshire tramways has been formally inspected and is now open for traffic. This is the section in the Shipley township, extending from the boundary of the township at the Bingley end of Nab Wood to the Thackley boundary. The line has a length of rather more than 2½ miles, and the whole of that section, in addition to a good deal of the Otley road section, has been constructed since March 9 last.

A. C. S.

EQUIPMENT CONTRACTS AWARDED IN CHICAGO

Contracts for 100 new electric cars and motors have been awarded by Receivers Eckels and Sampson for the Union Traction Company, of Chicago. The St. Louis Car Company will construct the cars for \$2,535 each, and the General Electric Company will furnish the motors. The total cost of the new equipment is placed at \$493,500. The cars will be 40 ft. long, with six large windows on each side, reversible cross seats and large platforms with rolling doors. They are to be delivered by Dec. 15. The first delivery will be made about Nov. 1.

President Roach says the company will begin the construction of the electric railways as soon as permits are received from the city. He says he applied for permits three or four weeks ago, but has heard nothing from the public works department in response to his application. The assurance is given by Commissioner Blocki that the permits will be granted at once.

The city authorities refuse to issue permits for the change in motor power on the ground that the company's franchise has expired, and it has no right in the streets, and because an ordinance is necessary to authorize the change from cable to trolley. The City Council, they say, must act on Mr. Roach's application for permits. Mr. Roach claims that the company's ordinances allow a change of power upon a permit to be issued by the commissioner of public works.

The members of the local transportation committee say they probably will not grant authority to the Union Traction Company to change its power until a new franchise ordinance has been passed.

An extensive network of electric lines is to be constructed and operated by the municipality of Moscow, Russia. New lines will be built and then the existing horse roads will be electrically converted. Before the system is completed, which will take about three years, fully 175 miles of lines will be electrically operated. Vladimir F. Gnesin, a well-known Russian electrical expert, Morris Building, New York, can give further particulars to interested parties.

LOCOMOTIVE FOR HAULING COAL IN OHIO

The Youngstown & Southern Railway Company is negotiating with builders of electric locomotives for three engines of the heaviest type. It is the aim to haul twenty coal cars, each loaded with 50 tons of coal. The new company will build a low-grade road from Youngstown to East Liverpool, touching important coal fields in the East Liverpool district heretofore undeveloped through lack of railroad facilities. The promoters of the company own 5300 acres of coal land, which will furnish the best grade of North Lima coal, a fuel equal to that produced in the Massillon district. The coal will be marketed in Youngstown, and the company will have a private right of way into the city, which will connect with the belt line around the city. As already outlined in these columns, it will be built a third-rail road, and will be designed by Ernest Gonzenbach, who engineered several of the leading third-rail roads in this country.

DOUBLE TRACK LEGISLATION IN INDIANA

The increasing number of collisions between interurban cars in Indiana has re-emphasized the urgent necessity of double tracks on these lines for two reasons—first, for safety, and, second, to afford facilities for the rapidly increasing business. The general demand of the time, reinforced by competition, requires that fast time be made by interurban cars, which naturally increases the complications in operating cars. Switches for passing purposes are all right where the need of speed is not urgent, but under present conditions such close connections at meeting points are necessary that the margin of safety is not only extremely narrow, but the possibility of error and misunderstanding is considerable. This is evidenced by three very recent and serious collisions resulting from the above causes. The only remedy for this condition is double tracks from terminal to terminal, and the necessity is so apparent that legislation requiring roads to be constructed with double tracks is sure to be enacted in Indiana.

THE NEW YORK AND BOSTON RUMOR REVIVED

A special press despatch from Stamford, Conn., dated Sept. 19, says that plans are being completed for the operation of electric parlor and sleeping cars from New York to Boston, and quotes those back of the scheme as stating that the service will be begun within two years. The despatch further says that several electric railways now in operation between these two points may be absorbed by the new company. The identity of those behind the project, however, is not disclosed. The line is to run by way of Worcester, Hartford and New Haven. According to the scheme of traffic which has been worked out, residents in New York and Boston will be able to take the trip between these two cities in only twice the running time of the present steam railroads, and at half the expense. It will be possible for the new company to operate between Boston and Worcester over the Boston & Worcester Street Railway, if a traffic arrangement with that company can be made, and to operate between Worcester and Hartford over the Worcester & Hartford Street Railway, now under construction. Between Hartford and New Haven, however, there appears to be a serious break in the line, and the information at hand does not tell how this is to be overcome. Between New Haven and New York there is at present a series of lines. From Port Chester, of course, it might be possible for the company to operate into New York over the New York & Port Chester Railway, when that road is completed.

In "Cassier's Magazine" for September there is an article entitled "Electric Shocks from Fire Streams." After discussing the hazards of fighting fires amid live wires, the danger to firemen from electric shocks due to current carried to the nozzle of the hose by the stream of water when it comes in contact with a live wire, is discussed. So far as is known no fatalities due to this cause have occurred, but shocks that resulted in disablement are recorded. Some results are given of a series of experiments made recently in Germany. They were made with pressures of 6000 volts alternating current and 550 volts direct current, and the stream of water was directed against a portion of the wires from which the insulation had been previously removed. On the whole the results of the experiments showed that the danger is not ordinarily so great as has been generally supposed hitherto.

NEW PUBLICATIONS

The "Engineering" and Electrical Traction Pocket Book. Third Edition, 1903, revised and enlarged, by Philip Dawson. 16 mo.; XIV + 1411 pages; morocco; price, \$5.00. Published by John Wiley & Sons, New York.

This book needs no introduction to our readers. The first two editions have established it as an important adjunct to the library of every electrical engineer, and especially to those engaged in the traction field. The present edition has been completely revised, and a large number of sections have been entirely rewritten and brought up to date. Considerable new matter has also been added.

Manual of Statistics Supplement, Vol. 1, No. 1. Published by the Manual of Statistics Company, 220 Broadway, New York. Price, \$5.00 per year.

The value of financial information and statistics depends largely upon the promptness with which they are given to the reader, so that the monthly supplement which the publishers of the well-known Manual of Statistics have just commenced to issue will be appreciated by investors. The size of page and general make-up of the monthly is the same as that of the manual itself, and it is paged with the latter publication, so that it forms practically a supplement. In the first number statements are given of some of the most important late incorporations, as well as some recent annual reports, directors' changes, etc. The publication has an editorial department, also tables showing quotations, high and low, for the last two years, and for the last month, of the principal securities dealt in on the Boston, New York and Philadelphia exchanges, as well as other financial tables. To annual subscribers the publishers furnish a handy binder.

LONG NARROW GAGE RAILWAY FOR SOUTHWESTERN AFRICA

The firm of Arthur Koppel has been awarded the contract for the building and equipping of a narrow gage railroad, about 400 miles long, by the Otavi Mining & Railroad Company. The railroad is to be used in the service of the copper mines in the districts of Octavi and Tsumeh in Southwestern Africa. The total cost of building the road is approximately \$4,500,000.

The contracting firm has formed a company with several prominent German banks to build this road, which has to be finished within two and one-half years.

The firm of Arthur Koppel will build and equip the road complete, including rails, steel ties, rolling stock and all other equipment. By one of the last steamers fifteen engineers of the firm left Hamburg for Southwestern Africa to begin the work.

OPENING THE ROCHESTER & EASTERN RAILWAY

It is expected that the Rochester & Eastern Rapid Railway will be formally opened this month. The route will be from Canandaigua to Geneva and thence to Rochester, a distance of 41 miles, through a prosperous farming country, touching many villages. The new road connects with the Rochester Railway at the end of the Monroe Avenue line, and cars will be run over the Monroe Avenue route of the Rochester Company to Main Street, and will turn through State, Church and Sophia Streets in the same manner as the Sodus Bay cars do at present, thus giving the new company admission to the heart of the business district. A few cars are now running in Canandaigua. Two power houses have been constructed, one at Canandaigua and the other at Geneva. A large car house has also been built at Canandaigua, where the offices of the company will be established. The company is controlled by the Comstock-Haigh-Walker interests, of Detroit, Mich.

The Sheffield Company, which is to construct a plant at Sheffield, Ala., for lighting the towns of Florence, Sheffield and Tusculumbia, and operating an electric railway, both freight and passenger, to be built by the company between those places, has just placed contracts through its New York office for cars, etc. The American Car & Foundry Company, Jackson & Sharp, Wilmington, Del., branch, has taken an order for eight cars—five open, fifteen-bench type, and three closed 44 ft. 2 ins. The trucks will be Peckham. The motors—No. 68—of each car will be of Westinghouse build. The power house, whose initial capacity will be about 850 hp, will be equipped with Wickes boilers, Brown Corliss engines, and Westinghouse generators. A 325 kw, three-phase, alternating-current machine will take care of the railway work, while a 250-kw generator will furnish the lighting power.

TRUCKS FOR ELECTRIC AND STEAM RAILWAY CARS

Raymond R. Frazier, United States Consul at Copenhagen, Denmark, writes to the Department of Commerce and Labor at Washington, that a well-known firm of agents in Copenhagen desires to correspond with firms in the United States which are in a position to furnish trucks for street cars and steam cars in a country where the government will undertake the construction of new lines of railway, electric and steam. Trucks for passenger cars will be required for the electric lines, and trucks for passenger and freight cars for the steam railways. Letters forwarded to the office of the Consul will be promptly delivered.

PARIS SUBWAY REFORMS

The municipal committee, which has been investigating the recent tunnel disaster on the Metropolitan Railroad, has drawn up a report, which has been approved by the prefecture, indicating the reforms which should immediately be made in the underground railroad system of Paris.

The principal proposals are as follows:

The present system of a motor at each end of the train should be abandoned; the motor must be capable of isolation from the train. In case of the slightest fire the train must be stopped and the motors cut out. Telephones and speaking tubes must be provided at reasonable intervals along the line. The number of employees at the stations must be increased. The platforms must be cleared of every obstruction, and lighted by an electric current independent of the current supplying the traction and the lighting of the tunnels. Numerous lamps must be placed to indicate the direction of the exit, at which a powerful inextinguishable lamp must be lighted. An alarm must be sounded when it is necessary to clear a station.

The report says that it is proposed later to insist on the use of incombustible rolling stock, and the construction of refuges in the tunnel walls.

PAPERS FOR THE WESTERN SOCIETY OF ENGINEERS

The Western Society of Engineers, headquarters of which are at No. 1734-41 Monadnock Block, Chicago, where most of the meetings are held, has announced the following programme for meetings during the remainder of the fall and winter up to Jan. 20, 1904:

Sept. 16.—"A Combination Steel and Concrete Railway Cross-Tie," G. W. Kimball, of New York.

Sept. 30.—"Hydro-electric Power Development at Joliet, Ill.," T. T. Johnston, M. W. S. E.

Oct. 7.—"Sewage Disposal in Iowa," Prof. A. Marston, M. W. S. E.

Oct. 21.—"The Use of Superheated Steam," Prof. Bull, M. W. S. E.

Nov. 4.—"The Haskell Self-registering Water Gauge," G. A. M. Liljencrantz, M. W. S. E.

Nov. 18.—"Asphalt and Bitumen, and Their Use in Structural Work," H. Wiederhold, of Philadelphia.

Dec. 2.—"The Movement of Iron Ore on the Great Lakes," A. J. Mason, M. W. S. E.

Dec. 16.—"Heating from a Central Station," W. H. Pearce, M. W. S. E.

Jan. 5.—Annual meeting and dinner.

Jan. 20.—"Railroad Signaling," E. E. Ellis, M. W. S. E.

The first meeting of the season was held on Sept. 2.

SOUTHWESTERN ELECTRICAL ASSOCIATION

The Southwestern Electrical Association, of Oklahoma and Indian Territory, has been organized in Oklahoma City, as an association embracing the varied electrical interests of the two Territories and the Southwest. The object of the association is to bring together at semi-annual conventions, the representatives of the various electrical interests in the Southwest. It has been decided to hold the first semi-annual convention in Oklahoma City on Oct. 9 and 10. Papers on telephone, electric light and street railway work are to be read, and there will be social features, embracing inspection trips to different plants and street railway systems and a banquet. The full programme will be published later. The initiation fee of the association has been placed at \$10, but it has been decided to reduce this to \$5 for charter members, good until the October convention. The initiation fee also includes the current year's dues, which means the fiscal year ending in May.

A CAR TRUST ASSOCIATION FOR STREET RAILWAYS

The Virginia Passenger Car Trust Association has been formed for the purpose of supplying and leasing cars to the Virginia Passenger & Power Company, of Richmond, Va. There are three managers, viz., E. T. Jeffrey, Jasper Bayne and B. H. Harned, all of New York, and the trustee is the Bowling Green Trust Company. The organization of associations of this kind is common in steam railway work, but is a novel departure in street railway practice.

The Series "A" stock of the new company has been sold, and twenty-two cars have been ordered from the St. Louis Car Company, which are to be equipped with Christensen air brakes and Bemis trucks. This equipment will reach Richmond about Oct. 1, when it will immediately be put in operation.

BRITISH WESTINGHOUSE WORKS

The British Westinghouse Electric & Manufacturing Company, Ltd., has had reprinted in magazine form an article recently written by G. R. Dunnell for Traction and Transmission, describing the company's great Trafford Park Works. Mr. Dunnell has done full justice to the importance of the subject, his article being very thorough in every respect.

It is stated in this article that the chief work of the company will be the manufacture of electric generators, motors, steam engines, steam turbines, gas engines, magnetic brakes, switch gear, Westinghouse-Bremer arc lamps and other Westinghouse products.

The publication just issued contains a detailed description of every department, a plan and section of the works, and numerous illustrations which serve to make clear even better than verbal description the vast extent of this undertaking, and the great scale on which the whole scheme has been carried out.

BLOCK SIGNAL CONTRACT FOR NEW YORK SUBWAY

A contract for the equipment of its line with a block signal system has recently been awarded the Union Switch & Signal Company, by the Interborough Rapid Transit Company (subway), of New York.

The Westinghouse electro-pneumatic system is to be installed, but a new feature is to be introduced, that of using alternating current. It is obvious that the use of track circuits on third-rail roads, where the rails are used for the return circuit, and at the same time for the signalling circuit, introduces what may be serious complications. In order to avoid these difficulties, the signals will be controlled by alternating current, through relays that are sensitive to alternating current only, and which will not be affected by the direct current used for train service in the subway.

A similar system is being installed by the Union Switch & Signal Company on the North Shore Railway, of California, which runs about 30 miles north from Sausalito, across the bay from San Francisco. This being a high tension third-rail electric road, alternating current will be used for operating the signal system, in connection with a track circuit.

CLEVELAND & SOUTHWESTERN TRACTION COMPANY ELECTS NEW OFFICERS

Owing to his poor health A. H. Pomeroy has resigned the presidency of the Cleveland & Southwestern Traction Company. His son, F. T. Pomeroy, has been elected in his stead.

F. T. Pomeroy has been general manager and treasurer, and he now relinquishes the latter office for that of president, holding at the same time the position of general manager.

The vacant treasurership has been filled by the election of F. L. Fuller. Mr. Fuller is a broker in the Garfield Building and has been interested in the company since its organization. In addition the position of assistant treasurer has been created, and J. O. Wilson has been elected to fill it. He has been general passenger agent of the road for some time, which position he will continue to hold.

A. H. Pomeroy, who now retires from the presidency of the company, has been associated with the line largely in an executive and advisory capacity. His business has been that of a banker. The active duties of promoting and constructing the lines which have been joined under the name of the Cleveland & Southwestern Traction Company, have been the work of F. T. Pomeroy, who now takes up the reins of control.

FROM INDIANAPOLIS TO PITTSBURG BY TROLLEY

A trip by trolley from Indianapolis to Pittsburg looms up as a possibility of the not far distant future. The opening of the road from Pittsburg to Wheeling, W. Va., and the contemplated extension to Bellaire, Ohio, are the beginning of the line connecting the two cities. The lines from Indianapolis to Bellaire will be 364 miles long, and if the line is extended to Wheeling and Pittsburg it will make the latter city the hub of a vast system extending in all directions. The plan is regarded as feasible, even where the electric lines come into sharp competition with the steam roads. The longest continuous electric road thus far running is from Indianapolis eastward, via Richmond, Dayton, Springfield and Columbus to Newark, Ohio, a distance of 226 miles. Another line, 26 miles long, now nearing completion, will extend from Newark to Zanesville, where there will be a connection with the Ohio River & Western. A road is in operation from Zanesville to Bellaire, 112 miles, making the total distance from Indianapolis to Bellaire 264 miles.

STREET RAILWAY PATENTS

[This department is conducted by W. A. Rosenbaum, patent attorney, Room No. 1203-7 Nassau-Beekman Building, New York.]
UNITED STATES PATENTS ALLOWED SEPT. 8, 1903

738,170. Means for Bridging Over Fire Hose; William L. Doughty, Oshkosh, Wis. App. filed Nov. 28, 1902. Relates to means for attaching a supplemental rail having recesses for the fire hose, to the main rail.

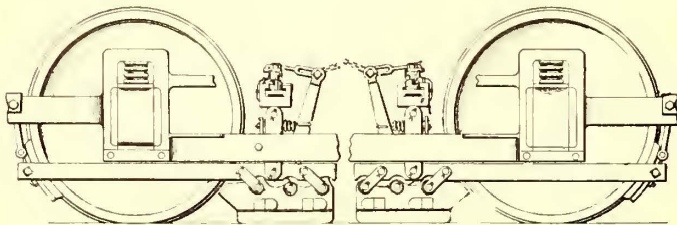
738,172. Fluid Operated Sander; Frank H. Edwards, McKees Rocks, Pa. App. filed Jan. 2, 1903. A fluid operated sander having an air-conducting tube provided with one or more holes, which direct the air into the sand to agitate the same, and with another hole which directs the sand so as to expel it from the sander.

738,195. Switch-Operating Mechanism; William J. Hynes, Utica, N. Y. App. filed Sept. 27, 1902. A star-wheel set in the road-bed is adapted to throw the switch, when engaged by a projection on the car, by means of a system of gears and levers.

738,205. Switch Throw; Clarence C. Korn, Johnstown, Pa. App. filed Oct. 15, 1902. The combination with an operating lever and a switch rod to be operated thereby, of a short intermediate lever, parallel with the operating lever, and fulcrumed eccentrically thereon, one arm of the intermediate lever being connected with the short arm of the operating lever, and its other arm with the switch rod.

738,207. Automatic Derailer for Drawbridges; John P. Cowing, Cleveland, Ohio. App. filed Aug. 27, 1901. Details.

738,209. Combined Rail and Wheel Car Brake; William M. Deal, Philadelphia, Pa. App. filed July 16, 1902. Consists of a



PATENT NO. 738,299

brake frame embracing a wheel, a rail brake-shoe supported by one end of the brake frame, and a wheel brake-shoe supported by the other end.

738,305. Trolley for Electric Railways Having Overhead Wires for Supply of Current; Amedee Fayol, Bordeaux, France. App. filed June 28, 1902. A fork pivoted near the trolley wheel adapted to be thrown upward by pulling on a rope, to thereby guide the wire into the groove of the wheel.

738,602. Trolley Stand; John J. Bouchard and William F. Ensor, Bradford, Pa. App. filed Dec. 18, 1902. Relates to details of the horizontal pivot of the pole to avoid friction and exclude dust and dirt.

738,606. Switch Operating Mechanism; Bertram J. Delzeit and William J. Saker, Philadelphia, Pa. App. filed Feb. 18, 1903. Shifting rails arranged at each side of the truck of the car, are adapted when lowered to contact with arms extending upward from the switch tongue and thereby move the switch.

738,637. Switch Operating Device; Wilber K. Smith, Denver, Col. App. filed Feb. 10, 1903. Comprises a frame having swinging connection with a car, two rollers mounted in the frame, one forwardly of the other, having beveled flanges at opposite ends thereof

and means operated from the car platform for tilting said frame to bring either one of said flanges into operative position.

738,638. Railway Switch; Wilber K. Smith, Denver, Col. App. filed Feb. 11, 1903. Details of construction of a plate set in the roadbed and adapted to be engaged by the switch operating device described in the preceding patent.

738,647. Car Fender; John A. Williams and Lester B. Britton, Seattle, Wash. App. filed April 29, 1903. Details.

738,649. Contact-Shoe for Electric Railways; Walter D. Young, Baltimore, Md. App. filed Jan. 21, 1903. The shoe is so mounted that it will constantly maintain a square contact with the third rail.

738,651. Preventing Leakage of Current to Studs in Surface Contact Systems of Electric Traction; Benjamin H. Bedell, London, Eng. App. filed March 17, 1903. A conducting shield is interposed between the live rail or wire and the surface stud, so that any leakage current will be grounded before it reaches the stud.

738,676. Trolley Retractor; Richard H. Ham, Stockport, N. Y. App. filed Jan. 16, 1903. Details.

738,721. Third-Rail System; John H. Hughes, Greenwich, Conn. App. filed April 30, 1903. Angle-brackets supporting the third rail are clamped between, but insulated from, two inverted T-rails.

PERSONAL MENTION

MR. GLENN E. PLUMB, of Dixon, Ill., has been appointed general manager for the receiver of the Chicago General Railway Company.

MR. H. W. GINAVAN has been appointed electrical engineer of the main power station of the Appleyard system of roads to succeed H. C. Regan, resigned.

MR. RALPH D. MERSHON, the well known consulting engineer, sails for Europe Sept. 23, on a business trip of about six weeks. Mr. Mershon expects to visit London, Paris and Berlin.

MR. HOWARD E. HUNTINGTON, formerly assistant general manager of the Pacific Electric Railway Company, of Los Angeles, Cal., has been appointed superintendent of electrical construction.

MR. H. A. FRAZER, formerly master mechanic of the Montgomery Street Railway, of Montgomery, Ala., has resigned, and now has a similar position with the New Hampshire Traction Company, with headquarters at Salem, N. H.

MR. WALTER MATTINGLY, superintendent of the Vicksburg Electric Railway Company, of Vicksburg, Miss., has resigned to accept the management of the Mississippi territory for a soap company. His successor has not yet been named.

MR. WILLIAM RABER, for the past ten years superintendent of light and power for the Mansfield Railway, Light & Power Company of Mansfield, O., has been appointed general manager of the company. Mr. Raber was first connected with the construction department of the company.

MR. J. D. HOUSEMAN, JR., general manager of the St. Louis, St. Charles & Western Electric Railroad, of St. Louis, Mo., was presented, Sept. 4, with a handsome silver loving cup by the employees of the company. The presentation was made at a banquet given in celebration of the second anniversary of the completion of the road to the Missouri River.

MR. J. BOIES POTTER has been appointed general superintendent of the Worcester & Connecticut Eastern Street Railway, which operates between Worcester, Mass., and Moosup, Conn., and is soon to have a line through to Norwich, Conn. Mr. Potter formerly was superintendent of the northern division of the company. Mr. J. E. S. Kane has retired as superintendent of the southern division.

MR. ARTHUR A. ANDERSON has resigned as general superintendent of the Indiana Union Traction Company, and will be succeeded by Mr. C. A. Baldwin, general passenger agent of the company. Mr. Anderson will go to Kansas to perfect the organization of a company that proposes to build a system of electric railways connecting Independence, Coffeyville and Parsons. It is generally believed the Indiana Union Traction Company is back of the Kansas project.

MR. F. G. DANIELL, formerly with the Appleyard system of roads in Ohio, has been appointed general superintendent of the Cleveland, Painesville & Ashtabula Railway, of Cleveland, Ohio. This road is now nearing completion, and it is expected it will be placed in operation between Painesville and Ashtabula before Oct. 1. The cars will enter Cleveland under a traffic arrangement with the Cleveland, Painesville & Eastern Railway, and the line will form another link in the rapidly completing chain of lines between Buffalo and Chicago.

TABLE OF OPERATING STATISTICS

Notice.—These statistics will be carefully revised from month to month, upon information received from the companies direct, or from official sources. The table should be used in connection with our Financial Supplement "American Street Railway Investments," which contains the annual operating reports to the ends of the various financial years. Similar statistics in regard to roads not reporting are solicited by the editors. * Including taxes. † Deficit. ‡ Including earnings of Pan-American exposition period. † including all properties.

COMPANY	Period	Total Gross Earnings	Operating Expenses	Net Earnings	Deductions From Income	Net Income, Amount Avail-able for Dividends	COMPANY	Period	Total Gross Earnings	Operating Expenses	Net Earnings	Deductions From Income	Net Income, Amount Avail-able for Dividends
AKRON, O.	1 m., July '03	95,765	47,970	47,795	27,806	24,989	LONDON, ONT.	1 m., July '03	18,317	10,909	7,406	2,212	5,196
Northern Ohio Tr. & Light Co.	1 " " '02	81,130	40,588	40,542	16,765	23,777	London St. Ry. Co.	1 " " '02	16,337	9,297	7,040	2,311	4,729
	6 " " '03	398,281	211,733	167,189	132,024	36,164		2 " " '03	93,886	62,145	31,741	15,100	16,641
	6 " " '02	318,937	185,362	133,575	98,390	35,185		2 " " '02	81,401	52,464	28,937	15,904	13,033
ALBANY, N. Y.	1 m., July '03	-----	-----	63,182	25,382	37,800	MILWAUKEE, WIS.	1 m., July '03	270,499	130,101	140,398	75,383	65,015
United Traction Co.	1 " " '02	-----	-----	51,197	23,866	27,331	Milwaukee El. Ry. & Lt. Co.	1 " " '02	237,376	110,928	126,448	67,989	58,459
	6 m., June '03	1,590,357	1,083,171	507,186	-----	-----		1 " " '03	1,707,175	864,216	842,960	439,830	343,130
	6 " " '02	1,471,516	1,011,263	460,253	-----	-----		7 " " '02	1,512,005	723,232	788,773	457,543	331,230
AURORA, ILL.	2 m., July '03	92,956	37,808	55,147	40,000	15,147	MINNEAPOLIS, MINN.	1 m., July '03	364,471	164,037	200,433	60,937	139,496
Elgin, Aurora & Southern Traction Co.							Twin City R. T. Co.	1 " " '02	337,452	142,369	195,083	58,733	136,349
	1 m., July '03	26,202	11,289	14,913	-----	-----		1 " " '03	2,283,125	1,086,410	1,196,715	426,255	770,460
	1 " " '02	23,269	11,198	12,071	-----	-----		7 " " '02	2,003,892	922,740	1,081,152	410,267	770,885
	2 " " '03	48,976	22,311	26,665	-----	-----	MONTREAL, CAN.	1 m., July '03	216,237	116,157	100,079	24,696	75,383
	2 " " '02	43,512	21,843	21,669	-----	-----	Montreal St. Ry. Co.	1 " " '02	198,656	93,967	104,689	19,930	84,760
BROOKLYN, N. Y.	3 m., June '03	3,394,490	1,981,983	1,412,507	1,069,639	312,869		10 " " '03	1,788,178	1,109,810	678,368	189,363	489,005
Brooklyn Heights R. Co.	3 " " '02	3,133,993	1,851,119	1,282,874	1,072,879	209,995		10 " " '02	1,643,837	940,860	702,977	164,228	538,748
Brooklyn, Queens Co'ty & Suburban Ry. Co.	3 m., June '03	229,840	207,704	22,136	-----	-----	NEW YORK.	3 m., June '03	3,361,974	1,302,089	2,059,885	684,563	1,375,322
Coney Island & Brooklyn R. R. Co.	3 m., June '03	438,874	255,685	183,189	67,934	115,255	Interborough Rapid Transit Co.	12 " " '02	2,968,537	1,401,106	1,567,431	655,849	911,582
	3 " " '02	426,123	229,210	196,913	53,638	143,275		12 " " '03	12,555,196	5,460,794	7,094,402	2,820,859	4,273,544
	1 m., June '03	323,098	176,935	146,163	130,528	15,635		12 " " '02	11,291,711	5,518,585	5,773,126	2,099,671	3,673,455
	1 " " '02	277,246	147,614	123,632	126,141	2,509	OLEAN, N. Y.	1 m., June '03	7,435	3,758	3,678	2,376	1,302
	3 " " '03	945,576	519,062	426,494	389,394	37,100	Olean Street Ry. Co.	12 " " '02	74,866	38,715	36,152	21,228	14,923
	3 " " '02	786,281	436,915	349,366	375,039	71,342		12 " " '03	56,040	29,118	26,922	16,493	10,428
	12 " " '03	3,728,173	2,013,624	1,714,549	1,538,484	176,065	PEEKSKILL, N. Y.	12 m., June '03	106,757	*63,605	43,152	27,215	15,937
	12 " " '02	4,566,503	2,254,084	2,312,418	1,548,960	763,458	Peekskill R. R. & Lighting Co.	12 " " '02	86,795	*56,392	30,403	23,125	7,277
CHICAGO, ILL.	1 m., July '03	20,529	8,523	21,006	-----	-----	PHILADELPHIA, PA.	1 m., July '03	143,037	-----	-----	-----	-----
Chicago & Milwaukee Elec. Ry. Co.	1 " " '02	23,591	7,586	16,005	-----	-----	American Railways.	1 " " '02	120,291	-----	-----	-----	-----
	7 " " '03	123,250	48,370	74,880	-----	-----		12 " " '03	1,240,807	-----	-----	-----	-----
	7 " " '02	102,531	45,638	56,892	-----	-----		12 " " '02	1,009,504	-----	-----	-----	-----
CINCINNATI, O.	6 m., June '03	573,384	338,965	234,419	126,254	108,164	Pueblo Suburban Traction & Lighting Co.	1 m., June '03	41,867	34,841	7,026	-----	-----
Cincinnati, Newport & Covington Light & Traction Co.	6 " " '02	519,241	296,985	222,256	125,966	96,290		1 m., July '03	115,291	56,275	58,986	25,896	33,089
CLEVELAND, O.	1 m., July '03	43,692	22,539	21,153	-----	-----		1 " " '02	99,570	49,098	50,472	24,857	25,615
Cleveland & Southwestern Traction Co.	7 " " '03	240,538	143,419	97,119	-----	-----	ROCHESTER, N. Y.	2 " " '03	221,063	107,613	113,450	51,543	61,906
	1 m., July '03	455,432	251,212	204,220	84,621	119,599	Rochester Ry.	2 " " '02	189,614	96,716	92,898	49,611	43,287
	1 " " '02	391,205	212,645	178,500	79,287	99,273		12 " " '03	1,324,352	692,931	631,421	392,882	238,539
	7 " " '03	2,489,622	1,468,701	1,020,921	575,386	445,535		12 " " '02	1,068,222	572,983	495,239	313,540	181,699
	7 " " '02	2,211,551	1,251,643	959,908	542,950	416,958	ST. LOUIS, MO.	1 m., July '03	632,704	469,744	162,960	129,110	36,851
DULUTH, MINN.	1 m., July '03	61,412	28,107	33,305	15,876	17,429	St. Louis Transit Co.	1 " " '02	508,173	446,164	122,009	74,233	47,776
Duluth Superior Traction Co.	1 " " '02	52,632	24,985	27,647	14,685	12,962		7 " " '03	4,100,108	-----	-----	-----	-----
	7 " " '03	355,833	201,638	154,165	82,388	71,777		7 " " '02	3,582,760	-----	-----	-----	-----
	7 " " '02	329,039	157,399	140,640	77,528	63,112	SAO PAULO, BRAZIL.	1 m., June '03	102,500	32,500	70,000	-----	-----
GLENS FALLS, N. Y.	3 m., June '03	110,046	92,708	17,338	44,587	+ 27,249	Sao Paulo Tramway, Light & Power Co., Ltd.	1 " " '02	-----	-----	-----	-----	-----
Hudson Valley Ry. Co.	3 " " '02	91,931	61,866	29,765	36,958	+ 7,193		6 " " '03	632,364	195,016	437,348	-----	-----
								6 " " '02	-----	-----	326,886	-----	-----
HAMILTON, O.	1 m., July '03	51,637	26,141	25,496	16,084	9,413	SAVANNAH, GA.	1 m., July '03	50,312	27,194	23,118	9,832	13,286
The Cincinnati, Dayton & Toledo Trac. Co.	3 " " '03	144,307	74,930	69,377	48,204	21,173	Savannah Electric Co.	1 " " '02	46,551	24,449	22,101	9,583	12,518
	3 " " '02	131,224	65,596	65,629	49,508	16,121		12 " " '03	503,230	297,612	205,618	115,510	90,118
								12 " " '02	461,010	275,244	185,766	-----	-----
HANCOCK, MICH.	1 m., June '03	16,417	9,566	6,851	2,929	3,923	SCHENECTADY, N. Y.	3 m., June '03	190,666	106,360	84,306	35,832	48,474
Houghton County St. Ry. Co.	1 " " '02	16,008	9,453	6,555	2,604	3,951	Schenectady Ry. Co.	3 " " '02	111,465	84,372	27,093	20,351	6,742
	12 " " '03	182,576	121,202	61,374	33,200	28,174		1 m., June '03	175,513	117,546	57,967	24,053	33,915
	12 " " '02	158,580	90,395	68,186	28,310	39,876		1 " " '02	151,317	109,332	41,986	21,557	20,429
HAZLETON, PA.	1 m., July '03	14,477	5,771	8,706	-----	-----	SEATTLE, WASH.	12 " " '03	2,018,907	1,429,737	589,170	282,473	306,696
Lehigh Traction Co.	1 " " '02	7,170	5,262	1,908	-----	-----		12 " " '02	1,655,130	1,134,301	520,828	249,555	271,274
	7 " " '03	77,424	45,448	31,976	-----	-----	SYRACUSE, N. Y.	1 m., July '03	71,945	39,490	32,544	20,266	12,188
	7 " " '02	60,652	38,733	21,919	-----	-----	Syracuse Rapid Transit Co.	1 " " '02	62,570	34,364	28,205	19,025	9,180
HOUSTON, TEX.	1 m., June '03	37,237	21,976	15,261	6,713	8,548		2 " " '03	37,589	77,500	60,089	40,483	19,665
Houston Electric Co.	1 " " '02	31,899	16,679	15,220	6,250	8,970		2 " " '02	123,433	69,164	54,268	38,050	16,219
	12 " " '03	298,220	246,216	152,004	77,240	74,703	TERRE HAUTE, IND.	1 m., June '03	38,485	24,366	14,119	6,560	7,559
	12 " " '02	322,560	187,731	134,829	-----	-----	Terre Haute Elec. Co.	1 " " '02	25,136	19,726	5,409	6,280	+ 871
ITHACA, N. Y.	3 m., June '03	29,637	15,137	14,500	5,218	9,282		12 " " '03	410,346	279,888	130,458	78,059	52,339
Ithaca Street Ry. Co.	3 " " '02	26,062	26,622	+ 559	5,720	+ 6,279		12 " " '02	307,824	264,610	43,214	68,758	+ 25,545
JACKSONVILLE, FLA.	1 m., June '03	20,359	12,847	7,512	2,996	4,517	TOLEDO, O.	1 m., June '03	141,545	71,806	69,739	41,135	28,604
Jacksonville Electric Co.	1 " " '02	16,784	9,236	7,548	3,125	4,423	Toledo Rys. & Lt. Co.	1 " " '02	122,682	65,142	57,540	37,854	19,686
	12 " " '03	223,465	153,850	69,614	34,746	34,868		6 " " '03	772,178	401,206	370,972	242,070	128,902
KNOXVILLE, TENN.	6 m., May '03	125,073	68,761	56,311	37,132	19,179		6 " " '02	671,284	352,331	318,903	227,033	91,870
Knoxville Traction Co. & Knoxville Electric Light & Power Co.	6 " " '02	100,456	65,589	34,867	36,409	* 1,542	Lake Shore Electric Ry. Co.	1 m., July '03	67,186	* 34,061	32,125	-----	-----
								1 " " '02	49,122	* 25,961	23,161	-----	-----
LEXINGTON, KY.	1 m., July '03	32,725	18,441	14,284	5,412	8,872		7 " " '03	327,089	* 119,437	107,652	-----	-----
Lexington Ry. Co.	1 " " '02	29,815	15,386	14,429	4,321	10,108		7 " " '02	248,555	* 158,912	89,643	-----	

NEWS OF THE WEEK

CONSTRUCTION NOTES

LOS ANGELES, CAL.—The end of August marked a decided reduction in the construction force of the Pacific Electric Railway Company, as most of the interurban lines planned by the company for the present have been completed. The line to Whittier is all completed, except the laying of rails, which are late in arriving. The poles are up, the trolley wire is strung and the roadbed is ready for the steel.

LOS ANGELES, CAL.—Standardizing the lines of the Pacific Electric Railway Company in Pasadena has been completed and the construction camps are now at work on the division into Rubio canon.

SAN FRANCISCO, CAL.—Representatives of the Standard Oil Company propose to build an electric railway to connect Point Richmond with West Berkeley. The franchise, for which application has been made, calls for a road from San Pablo via Richmond, Barrett Station and Steege to West Berkeley, where connections can be made with other steam and electric lines for San Francisco. At Point Richmond the Pacific Coast Oil Company, which is a branch of the Standard Oil Company, has large petroleum refineries, the oil being pumped through a 300-mile pipe line from Bakersfield. Among the promoters of the enterprise are: John C. Black, superintendent of construction of the refineries of the Pacific Coast Oil Company; E. A. Gowe, of the same company; C. Kinney, an electrical contractor, and L. D. Dimm, a manufacturer of lubricating oils. Some of the stock has already been paid in. The passenger business will be taken care of with high-class equipment, and there will also be a light freight and express service. The electric power for the operation of the road can be supplied from the Bay Counties transmission lines. The route will be through a growing manufacturing district along the bay shores of Contra Costa and Alameda Counties.

NEW HAVEN, CONN.—Thomas C. Perkins, of Hartford; Fred C. Hinds and Charles H. Wilson, of Boston; Edwin C. Pinney, E. C. Dennis and Alvarado Howard, of Stafford Springs, have been elected directors of the Stafford Springs Street Railway Company at a recent meeting. It was also voted to accept the amendments to the charter as granted at the last session of the Legislature. The amendment covers the right to construct a two-track road over Park Avenue, East Main Street and East Street, also from the Springs to the State line on the route to Monson by the way of Orcuttville and Eliothorpe. The amendment changing the principal office from Stafford Springs to New Haven was also accepted.

PLAINVILLE, CONN.—A meeting of the incorporators of the Plainville & Farmington Tramway Company was held at the office of Knapp & Seymour, in Bridgeport Friday, Sept. 11, and organization effected. This company proposes to operate the road already built. The stockholders are: J. T. Patterson, of Bridgeport; J. B. Cornwall, of Bridgeport; Arthur Perkins, of Hartford; Howard H. Knapp, of Bridgeport; W. J. Carroll, of Hartford. They were elected directors of the company, and at the meeting of the directors J. T. Patterson was chosen president and treasurer, and W. J. Carroll, secretary. They will hold office until the annual meeting in February. The directors voted to instruct and empower the president to make arrangements for putting the road into operation at an early date. It is believed that cars will be running this fall. It is said that the roadbed is in good condition and that the little overhead work required can be done in a few days. The company is negotiating for cars and for supplying of power.

WASHINGTON, D. C.—The District Government has granted the formal permit to the Philadelphia, Washington & Baltimore Railroad, as the Pennsylvania Road is known here, to construct the twin tunnel under the United States Capitol Building and the adjacent blocks and streets. The permit had been held up for several weeks because of a difference between Major Biddle, the Engineer Commissioner, and the railroad engineers in regard to the motive power to be used to propel cars in the tunnel. Major Biddle insisted that electricity should be used, and the railroad men wanted to be allowed to use steam. Electricity was finally agreed on. The tunnel will be 3000 ft. long, beginning at the intersection of Massachusetts Avenue and First Street, North-east, going under Capitol Hill to New Jersey Avenue and D Street, South-east. The total cost of the work will be approximately \$800,000. There will be two branch tunnels connecting with wards and tracks of the Pennsylvania Road in South Washington.

HAZLEHURST, GA.—The City Council has granted a right of way and other privileges to Russell & Seckle, promoters of the proposed electric railway from this city into the western portion of this county.

GAINESVILLE, GA.—The Atlanta, Buford & Gainesville Railway Company has applied for a charter and proposes to erect an electric plant on the Chattahoochee River to furnish power for operating a street railway from Gainesville to Atlanta, and for furnishing power for Buford and other points along the line. Over 500 acres of land have been purchased and several hundred dollars have been spent on surveys. Options are being taken on large tracts of land near the river. The petitioners for charter are: H. D. Jaquish and C. C. Sanders, of Gainesville; M. S. Garner, G. W. Thompson, J. O. H. Brown, of Buford; E. J. Michael, of Idaho; J. W. Peterson, W. W. Gorman and G. W. Winslow, of Chicago, and D. B. Stancliff, of Atlanta. The capital stock of the company is to be \$100,000, with shares at \$100 each.

CHICAGO, ILL.—Marshall Sampson, one of the receivers of the Chicago Union Traction Company, who has just returned from New York, is quoted as authority for the statement that steps are to be taken at once to equip with electricity all the lines of the company now operated by cable. A large increase in the number of cars is also indicated from Mr. Sampson's remarks.

EAST ST. LOUIS, ILL.—Incorporation papers have been filed by the Municipal Traction Company, of East St. Louis. The new company proposes to build electric railways through the southeastern part of the city. The capital stock is \$100,000. The officers of the company are: C. O. McCasland, president; C. G. Derleth, vice-president; P. J. Soucy, treasurer, and D. H. Morrell, secretary.

GALESBURG, ILL.—The Galesburg, Monmouth & Rock Island Railway Company has awarded part of the contracts for constructing its proposed line between Galesburg, Monmouth and Rock Island, and construction work will be begun at once. About 70 miles of line are to be built. Fourteen motor cars and ten trailers will be operated. The general contractors are the Arbuckle-Ryan Company. The power station will be equipped with three 500-kw alternating-current direct-connected generators, Corliss engines and Sterling boilers. The officers of the company are: G. F. Duncan, president; E. Woodman, secretary and treasurer; S. L. Nelson, manager and purchasing agent.

JERSEYVILLE, ILL.—The Union Traction Company, of Jerseyville, has been incorporated, with a capital stock of \$2,500. The object of the company is to build an electric railway and furnish light and power. The incorporators are: A. O. Auten, June M. Rhoades and Joseph W. Becker.

KEWANEE, ILL.—The City Council has granted a fifty-year franchise to the Kewanee, Cambridge & Geneseo Electric Railroad Company.

RIVERTON, ILL.—Within a few days work will begin on the construction of a power plant for the Decatur, Springfield & St. Louis Electric Railway. The company has purchased the old paper mill site at Riverton, and the power house will be built there on the Sangamon River. The building will cost \$230,000.

SPRINGFIELD, ILL.—The Central Traction Company, Jerseyville, has been incorporated, with a capital of \$2,500, to operate an electric railway. A. O. Auten, J. M. Rhoades and J. W. Becker are named as incorporators.

ANDERSON, IND.—Officials of the Indiana Union Traction Company announce that they are ready to receive bids for the erection of carshops in this city, work to begin at once. The company proposes to build and repair all of its own cars. The buildings will cover about six acres of ground, and cost upwards of \$300,000.

CORYDON, IND.—An election has been ordered for Harrison and Franklin Townships to vote on a proposition of subsidy to the Louisville & Southern Indiana Traction Company.

INDIANAPOLIS, IND.—The Indiana Union Traction Company has purchased Broad Ripple Park, which consists of 30 acres, and will expend \$75,000 in improving and beautifying it. The company will lay a double track between the city and the park, in order to handle traffic.

JEFFERSONVILLE, IND.—A franchise has been granted to Capt. E. J. Howard, and the old, and perhaps the only, mule street car line in Indiana will be changed to an electric line.

LOGANSPOUT, IND.—The Union Traction Company has filed in the Circuit Court a number of suits to appropriate land for the right of way of the Logansport, Hammond & Chicago Traction Company. This is the first move of the kind upon the part of the company.

LOGANSPOUT, IND.—The reconstruction of the old narrow-gage street railway system in this city has begun under the superintendency of E. C. Folsom. The downtown portion will be double tracked and also the line to Spencer's Park. An entire new equipment will be required, including ties, rails, wire, poles and rolling stock. The property is now in the hands of the merged company, known as the Indiana Union Traction Company.

MONTPELIER, IND.—A new interurban railway is projected between this city and Marion. C. H. McNath, of Indianapolis, and W. L. Padgett, of Chicago, capitalists, and others, have investigated and examined the proposed route, and say they are highly pleased with it. The proposed line will run almost directly east and west, passing through Roll, and will give a line through the best part of the oil fields of Blackford and Grant Counties.

PRINCETON, IND.—At the annual meeting of the stockholders of the Evansville & Princeton Traction Company the following directors were chosen: J. S. Heston, S. T. Heston, E. J. Baldwin, W. L. Sonntag, J. G. Le-grange. The directors then elected the following officers: President, Joseph S. Heston, Princeton; secretary and general freight and passenger agent, E. J. Baldwin, Princeton; treasurer and purchasing agent, Samuel T. Heston, Princeton; general manager, William L. Sonntag, Evansville.

PRINCETON, IND.—The Evansville & Princeton Traction Company's line, the first interurban electric line in Southern Indiana, has been completed, and a party of business men made the trial trip Sept. 10. The electrical equipment is not yet all in place, and steam dummies will be operated until all the electrical work is completed. The road is 27 miles long, and runs through the richest portion of the State. Work will next begin on the Hazleton extension, which will add 9 miles to the system.

WABASH, IND.—President Tuttle, of the Wabash-Rochester Traction Company, is said to be meeting with much encouragement and success in his efforts to revive the line between the two cities. The line is 37 miles long, and \$105,000 in subsidies have been voted to the enterprise.

MUSKOGEE, I. T.—C. N. Haskell, for the Muskogee Traction Company, has given a bond of \$10,000 to commence work on the street railway in Muskogee within thirty days. Cars are to be running within fifteen months.