Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Vol. XLII NEW YORK, SATURDAY, NOVEMBER 15, 1913 No. 20

PUBLISHED WEEKLY BY

McGraw Publishing Company, Inc.

James H. McGraw, President. C. E. Whittlesey, Secretary and Treas.
239 West 39th Street, New York.

Chicago Office.....1570 Old Colony Building
Philadelphia Office.....Real Estate Trust Building
European Office....Hastings House, Norfolk St., Strand, London, Eng.

Terms of Subscription

For 52 weekly issues, and daily convention issues published from time to time in New York City or elsewhere: United States, Cuba and Mexico, $3.00 per year; Canada, $4.50 per year; all other countries, $6.00 per year. Single copies, 10 cents. Foreign subscriptions may be sent to our European office.

Requests for changes of address should be made one week in advance, giving *old* as well as new address. Date on wrapper indicates the month at the end of which subscription expires.

Entered as second-class matter at the post office at New York, N. Y.

Of this issue of the Electric Railway Journal, 8000 *copies are printed.*

SETTLEMENT IN INDIANAPOLIS

Settlement of the Indianapolis strike means more to the public than it does to the company or its employees. The public is always the main sufferer, but it or its representatives usually want to take their own time and way about interfering in the labor difficulties of public utilities. In the present case it appears that a representative of the Department of Labor of the United States government and the Governor of Indiana are signatories to the agreement of settlement. They assume great responsibility by such an act. An even more unusual feature of the arrangement is that by which the Public Service Commission of Indiana is to serve as arbitrator. The public authorities in both high and minor places refused to give the Indianapolis company such protection by police or militia as would have enabled it to operate its cars in spite of violent assaults on its employees and property. That was a form of interference which the Indiana authorities were unwilling to undertake. It is to be hoped that the settlement of the strike will result in an arbitration that will not fail to protect the rights of the company, which is as deeply concerned in the outcome as the employees can possibly be.

MR. MELLEN PREDICTS GOVERNMENT OWNERSHIP

Of the many startling statements that may be culled from the recent interview in the Boston *Post* with Charles S. Mellen, perhaps the most interesting is the one to the effect that all railroads will ultimately go under government ownership. According to him, the regulation by the government during the last ten years has tended to lower the value of railroad stocks as investments, and private capital is gradually finding the field unprofitable. If Mr. Mellen's predictions are true, we shall probably then see before long a realignment of forces on the question of municipal or government ownership of public utilities. Its advocates will include discouraged investors in railway properties who realize that the courts will insist upon a fair appraisal of these properties if taken over for municipal operation, while its opponents will include union labor, which will see no more opportunity for organization under civil service rules than in the police or fire departments or among the letter carriers. Such a result seems as incongruous as a futurist painting, but we have heard several street railway presidents recently express the opinion that they would be glad to sell out to the city and get the cash which they and their friends had invested in their railway undertaking. We sympathize with this position, but it is more creditable from the standpoint of financial acumen than from that of civic duty. Electric railway officials of all men best know the difficulties of electric railway operation and management and the tremendous waste and injury which would come from municipal ownership and operation, and it is a matter of public duty with them to maintain an attitude of absolute hostility to the idea.

SMOKING ON CITY CARS

One result of the general adoption of prepayment operation has been the practical abolition of smoking on all parts of a closed city car. We say "practical" because in a few cases smoking has been permitted in the rear seats when the windows are open in summer. It is also still allowed in one or both end compartments in cars of the California type which are used on the Pacific Coast, but these cars are practically open cars, although often fitted with longitudinal seats. It is natural that these changes should have caused complaints on the part of those smokers who formerly were allowed to congregate on the front or rear platform, but they have been welcomed by a very large part of the non-smokers of the community. The question in New York, as well as in some other cities, is now an active one. The New York companies have very wisely left the adjudication of the matter to the Public Service Commission, contenting themselves only with showing the undesirability from an operating standpoint of any plan of designating certain cars, say every second or third car, as has been proposed, as a smoking car. While the matter is largely a question of local habit and custom, we confess that we have not any great sympathy for those who think that it is necessary to provide smoking accommodations on city cars. The ride, as a rule, is short, and we do not think it should involve a very great deprivation to ask a person to refrain from making a nuisance of himself to others during this time. The conditions may be different on the long runs, but on city cars with short runs there is not much use or place for the smoker.

THE LÖTSCHBERG LOCOMOTIVE

The 2500-hp locomotive for the Bern-Lötschberg-Simplon Railways, Switzerland, which is described elsewhere in this issue, adds one more to the large number of designs already developed for heavy electric traction. Briefly, the machine is of the geared jackshaft type with a drive composed of a double herringbone gear, two jackshafts, a joint triangular yoke and crank connections to five pairs of driving wheels. This drive differs greatly in appearance from the 2000-hp machine first built for this service, which had two trucks each with three pairs of coupled driving wheels and no pony wheels. However, the principle of the geared jackshaft is common to both designs. It is significant that the always-cautious Swiss engineers had such confidence in the new combination that the present locomotives were placed in regular service without any preliminary tests, and this confidence has so far been fully justified by the results in practice. The experience of the builder indicates that the geared jackshaft offers the most economical arrangement, at least for moderate speeds. It is interesting to note that the same principle, but in simplified form, is to be applied to one of the latest American electrifications where mountain conditions also obtain. There is no immediate likelihood, however, that either the gearless or straight jackshaft types will be superseded in high-speed work.

Nothing could illustrate better the diverse tendencies of electric locomotive design in the United States and abroad than the complex drive of the new Lötschberg locomotive. The American designer has worked toward the greatest simplicity even at some sacrifice of efficiency because neither in the erecting plant nor in the maintenance shop could he command the highly skilled but leisurely labor characteristics of countries like Switzerland. For example, one American expert, who has studied the new type, pronounces it "exquisite" but believes that its attempted duplication here would cost about 75 per cent more than a gearless locomotive of equal output, and he despairs utterly of its proper maintenance in many a United States roundhouse. Yet he has no doubt that in Switzerland the locomotive will fulfil the intentions of its designers and operators. This frank comment brings out the point that in questions of design the mechanism which is best theoretically may not be best in practice until the user has been educated to maintain it properly. Nevertheless, this view of the case is rather pessimistic when one bears in mind that the American steam locomotive has been developed to a high degree of reliability despite the rough and ready maintenance conditions on many lines. There are indications also that the standard roundhouse practices of steam railroads will be widely altered to suit electric operation.

With regard to the capacity of the Lötschberg locomotive, a few words are not out of place. A machine which can haul a 341-ton train up a 2.7 per cent grade at 31 m.p.h. for one and one-half hours continuously is very far from being a toy. In fact, it compares favorably with many of the American electric locomotives now in service. A comparison with the New York Central locomotive which was described in the Nov. 8 issue of this journal shows that the Swiss type is only 4 ft. 4 in. shorter than the 56-ft. 10-in. over-all length of that machine and that its weight of 117 tons exceeds the American type by 7 tons. Although a horse-power rating of locomotives is notoriously misleading, it is of interest to observe that the one-hour horsepower rating of the New York Central machine is 2600 hp, while that of the Lötschberg locomotive is 2500 hp on a one-and-one-half-hour basis. Presumably, the unusual basis of one and one-half hours was chosen because the ordinary single trip on the tunnel division is approximately 47 miles long. For the time bases named, the tractive effort of the Swiss machine is 29,700 lb. on 53-in. drivers, and of the American machine 20,000 lb. on 36-in. drivers. Thus the Lötschberg locomotive is a very respectable machine indeed, and one that might be even bigger were it not for the fact that draft rigging limitations do not permit a greater drawbar pull than 22,000 lb.

TRAIN OPERATION IN CITY SERVICE

An unusual degree of interest has been expressed with regard to the new tests on two-car trains which the Public Service Railway of New Jersey is preparing to carry out and which were outlined in our issue for Oct. 25. Among the communications on the subject which have been received since the announcement is one from a correspondent who was very much impressed with the advantages of center-entrance trailers after seeing their use in St. Louis. No doubt the center-entrance trail car is less liable to the congestion involved when all passengers enter and leave a car at one end, the motor car of the train avoiding it because it has a front exit controlled by the motorman. Indeed, this is one of the primary causes for the extended use of center-entrance trailers in Pittsburgh and other cities. On the other hand, the trail car with front-end entrance permits the use of existing cars in train service, and what is more important, it keeps the two entrances to the train close together so that no time is lost by intending passengers going from one entrance to the other. We should be glad to see some comparative figures on the length of time consumed at stops by both classes of trail cars, although the matter is of less importance than the general question of the value of train operation itself as compared with single cars.

Both questions, indeed, depend upon the effect which each method of operation has upon the schedule speed. Thus, as we explained in our issue of Oct. 25, it ought to be possible in considering the relative economy of single cars and two-car trains to determine for each road the point where the slower schedule of a two-car train will just balance in cost of operation its gain from a reduction in platform expenses. We find that we were in error, however, in quoting the engineers of the Public Service Railway in estimating this figure at 4 per cent. They believe that 10 per cent is probably more nearly correct, but will know more definitely at the conclusion of the tests which they are to conduct. It is not a simple matter to determine, from a theoretical analysis, the factors in the case. On the one hand, the two-car train makes a reduction in platform expense of 25 per cent, equivalent to a reduction in total operating expenses of about 8.5 per cent. Against this must be equated the expenses which increase with a slower

schedule. Thus, if a greater number of cars are required to handle the same traffic, the platform and carhouse expenses go up as do the fixed charges on the first cost of both cars and carhouses. There should also be some allowance for additional maintenance and general expenses, and possibly some for power, provided the number of stops per car is greater. Two-car train operation, however, is being tried on a large scale in a number of cities now, and it should not be long before exact figures will be obtainable.

THE TORONTO VALUATION REPORT

The advocates of city ownership for electric railways and light companies in Toronto are now confronted with figures showing that to fulfil their plans will necessitate an expenditure of almost $29,000,000. This sum, reached by Bion J. Arnold and J. W. Moyes, as stated elsewhere in this issue, approximates quite closely the $30,000,000 originally asked by Sir William MacKenzie for the transfer of the companies to the city. The problem of valuation did not present any great difficulties, and it is absolutely unlikely that the price already asked by the company had any influence upon the minds of the valuators. The figure was reached by a very simple, yet careful, method of appraisement. The valuing of the physical assets was only a matter of stock taking, with depreciation sufficiently written off at standard rates, and the ascertaining of the intangible value of the unexpired franchises of the companies was almost altogether a matter of estimating the companies' net earnings, earnings of past years affording the most essential part of the criteria.

Of course, the Toronto companies are perfectly justified in demanding payment for future profits when negotiating for the surrender of their franchises before termination. Some of the opponents of the policy of privately owned utilities, however, have looked upon this intangible valuation as "a ransom" to be paid for freedom from the companies' toils before the franchises automatically expire about seven and a half years hence. But the fact is that in spite of this comparatively short period of franchise life yet remaining, the appraisers determined that $10,713,553 was a conservative estimate for the present worth of the franchises and contractual rights of the Toronto Railway.

Certain peculiar conditions in the agreement between the city and the Toronto Railway limit the area in which the company must build its tracks and in which it has the right to charge the full rates of fare agreed upon. What transportation in this limited area has meant to the company may be judged from the fact that the population per mile of track, according to a comparative table in our issue of Oct. 25, is 3109, a figure surpassed in that table only by the systems in Greater New York. Moreover, the company's gross revenue per mile of track is $45,781, which exceeds by $10,000, in round numbers, the gross revenue per mile of track for such companies as the Chicago Railways, the Brooklyn Rapid Transit Company, the Philadelphia Rapid Transit Company and the United Railroads of San Francisco, and which is more than three times greater than the gross revenue per mile of track on the Denver City Tramway and the Detroit United Railway. The franchise of the Toronto Railway also confers such unusual exemptions from taxation and maintenance that its operating ratio for 1912 was 53.4 per cent, while the operating ratios of the above-mentioned lines, with the exception of the Brooklyn Rapid Transit Company and the Denver City Tramway, range from 64 per cent to 69 per cent. There is no doubt that the Toronto property has been profitable to its owners, and that on account of the past and future opening up of new suburban areas for which it furnishes the final transportation link in the old city area it would make ever-increasing earnings during the remainder of the franchise period.

In the calculation of the monetary value of these future earnings, however, the company was by no means favored, as the operating ratio adopted was 55 per cent, or 1.6 per cent higher than that which the company had shown itself capable of obtaining, and a large allowance was made for depreciation. Finally, in the estimates for the future gross earnings, not even the full application of the law of squares was allowed, and the lessened percentages thus obtained were further reduced for the later years on the contingency of possible subway construction, the final increases allowed being 10 per cent for three years, 8 per cent for the succeeding three years and only 6 per cent for the remaining life of the franchise. From 45 per cent of the gross receipts of 1912, increased by the above percentages each year, there was deducted the franchise tax, and the present value of the net profit for each year was obtained by discounting at 5 per cent the net profit for that year to July 1, 1913, which gave a total present value of $15,701,106. From this, however, the appraisers discounted and deducted interest on the investment at 5 per cent, computed not only on the present investment but also on that needed to meet future needs, leaving a net intangible value of $10,713,553.

It may be noted here that the appraisers did not allow the company anything for the appreciation of its real estate holdings at the close of the franchise period, although this increase is estimated by Mayor Hocken himself at $627,035. Furthermore, in connection with the future earnings for each year no recognition was given to the interest this amount would draw from that time until the end of the period, which, if discounted also, would make an appreciable addition to the estimated present value of the properties. Inasmuch as some appraisers hold that the present value of a franchise right is the summation of the present values of all residual net income accruing to the company year by year together with interest compounded to expiration, such amounts might have been added. These omissions, however, serve to show that the estimate reached by the appraisers is a conservative one.

The submission of the valuation report to Mayor Hocken has now brought the question of municipal ownership in Toronto to the stage of strict negotiations. The city now knows how much it must pay for the property, but the really serious question is not that of first cost. There is a very large Scotch element in the population of Toronto and the Scotch have a very high reputation for business ability, but we trust that even under these favorable conditions the citizens will consider the plan from all aspects before they vote in favor of municipal ownership.

The 2500-Hp Lötschberg Locomotives

The Locomotives Are for Single-Phase Operation at 15,000 Volts, Fifteen Cycles, Over an Alpine Trunk Railroad and Are Notable for a New Form of Drive with Helical Gearing and Side Rods

Several articles* have appeared in previous issues of the Electric Railway Journal on the Lötschberg Railway and its 9-mile tunnel, which was opened for traffic on June 28, 1913. These articles also included a description of the 2000-hp single-phase locomotive which had been ordered in 1908 by the "Berner Alpenbahn Gesellschaft Bern-Lötschberg-Simplon" from the Maschinenfabrik Oerlikon upon the recommendation of its consulting engineer, L. Thormann, of Bern, for trial service on the Spiez-Frutigen approach line.

Other firms were invited to compete, and they also delivered locomotives for trial. As the Oerlikon locomotive, however, proved most desirable, the railway decided in the year 1911 to order for the Spiez-Brig high-speed passenger and freight traffic thirteen other locomotives of a similar type but of larger capacity.

The contract stipulated that the electrical equipment of all locomotives should follow the plans and construction data of the Oerlikon company regardless of the companies which might be selected to assemble the locomotive. On this basis six of these equipments were made by Brown, Boveri & Company, Baden, and seven by the Oerlikon company. All mechanical parts were manufactured by the Schweizerische Lokomotiv & Maschinenfabrik, Winterthur, Switzerland.

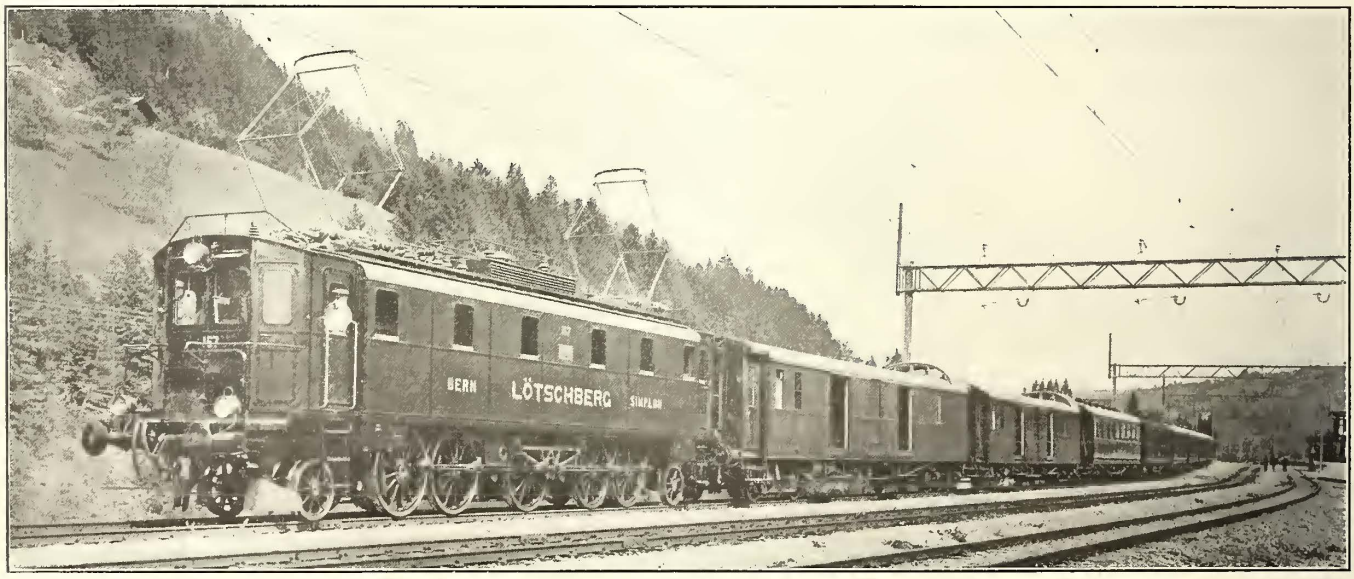
The opening of the railway as far as Brig took place on July 15, 1913, without any trial runs being considered necessary. Apart from a few natural disturbances at the commencement, such as the breaking of defective insulators with the well-known consequences of high-frequency overloading, all the locomotives proved satisfactory from the first day of operation, so that no alterations whatever of a technical nature had to be introduced. The change to electric service has already produced an extraordinary increase of traffic. Some locomotives have made not less than 325½ miles a day, which is equivalent to seven single trips over the mountain.

GENERAL FEATURES

The new locomotives are designed for a working capacity of 2500 hp for one and one-half hours at 31 m.p.h. They are of the 1-E-1 type, namely, five intercoupled driving axles and two pony-axles. At normal speed they develop a drawbar pull of 22,200 lb. and consequently draw a train of 310 metric tons on a grade of 2.7 per cent. The possible drawbar pull at starting is 30 per cent greater than that stated. The total tractive effort on a 1½-hour basis at the circumference of the driving wheels of 53-in. diameter amounts to 29,700 lb. The maximum train speed is 46½ m.p.h.

MECHANICAL CONSTRUCTION

The superstructure carries the two railway motors in the center, and the transformers, control, etc., are placed between the motors and the motorman's cabs. For convenience in maintenance and repair, the roof over the motor room is fitted with two detachable trap doors, and the sides of the section are also removable. End and side doors are built in as shown in the side view of a locomotive.



Lötschberg Locomotives—A Train in Service, Showing Also Catenary Overhead Construction

In order to obtain perfect flexibility on curves, the following axle arrangement has been adopted: The middle axle (driving axle) is reported to have the extraordinary side play of 0.98 in. (25 mm). The two adjacent axles are fitted without play into bearings fixed to the frame. The two end driving axles are said to have 1.57 in. (40 mm) side-play and are connected with the adjacent pony axles of the Krause-Winterthur pony trucks with sliding center pins and reaction springs. The pony axles therefore have even greater play, so that, notwithstanding the relatively great length of the locomotive, curves of but 364-ft. radius may be taken without difficulty. A special arrangement was devised to make possible the removal of pony axles without disturbing the springs. The middle axle was provided with spiral springs; laminated semi-elliptic springs were furnished for all other axles, but the ends of the locomotive were interconnected with equalizers.

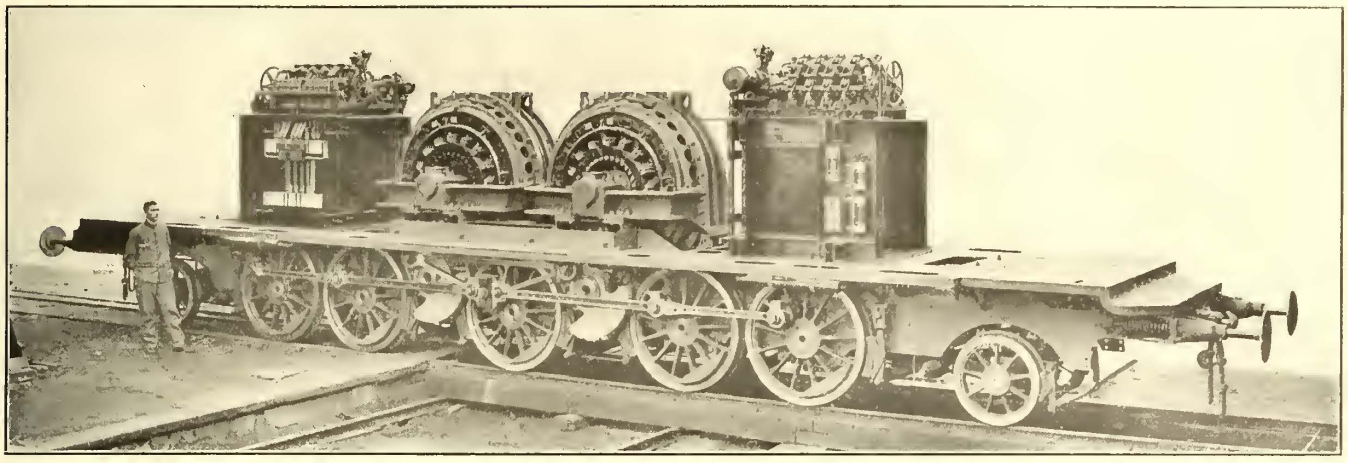
The braking and signal equipment comprises Westinghouse automatic brakes, handbrakes, air sanders and air signal whistle. Compressed air is employed for the current collectors and for a part of the safety appliances such as door bolts and ladders. The compressed air is produced by two compressor sets with a common governor.

*July 29, 1911; Nov. 20, 1909; Oct. 7, 1911, and Sept. 6, 1913.

Ordinarily the compressor nearer to the cab under service is used only to feed the brake reservoir, in which event a two-way valve in the cab allows the other compressor to feed the miscellaneous apparatus. A supplementary hand-operated air pump is provided for the initial lifting of the pantograph collectors.

choke coils. The current flows through the high-tension oil switches to the two transformers, thence through the shunts and to two grounding slip rings fitted to the fixed axle in the driving mechanism and so to the rails.

The choke coil and a condenser group, which are connected in parallel with the transformers, protect the loco-

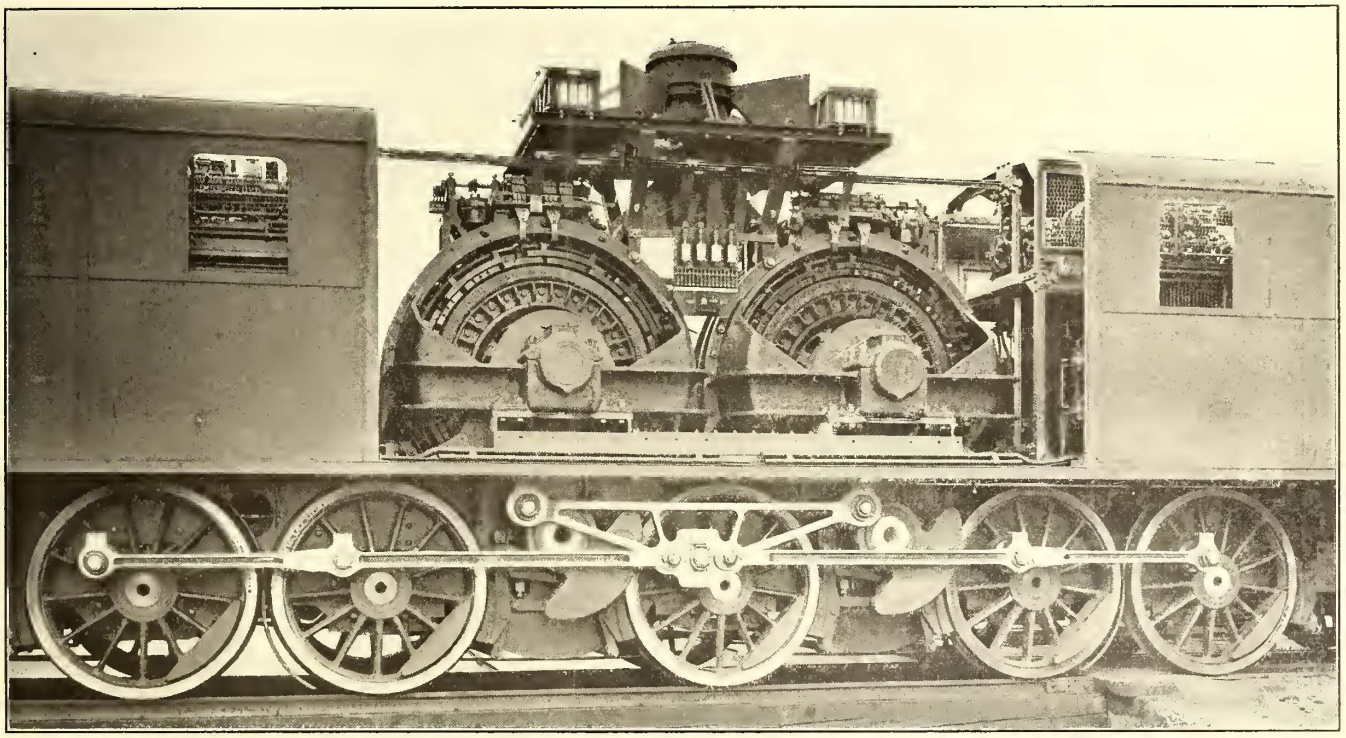


Lötschberg Locomotives—All Covering Removed, Showing Motors, Transformers, Control, Etc.

ELECTRICAL EQUIPMENT

The railway company required the electrical equipment to be divided into distinct duplicate sections, each half set being complete in itself. It is therefore possible to run with one-half of the equipment. Both equipments may also be run simultaneously either in series or in parallel. Moreover, both motors may be served individually by either of the two transformers. The locomotive is capable

motive against overloading. The two high-tension switches are constructed as oil switches for distant and hand-operated control. They have maximum and minimum current cut-outs and are provided with rheostats to prevent heavy shocks when the transformers are switched into the circuit. The transformers are of the air-cooled type with the two high-tension coils connected in parallel. The coils of the low-tension side are connected in series and have



Lötschberg Locomotives—Roof and Sides Removed to Show Motors and Accessibility for Inspection; View of Jack-Shaft and Scotch-Yoke Drive

of developing full drawbar pull and speed continuously with one transformer, one controller and the two motors coupled in series.

Single-phase alternating current of 15,000 volts is taken from the line by two pantograph collectors and conducted to the two halves of the electrical equipment through two

twelve different steps of about 45 volts each for speed regulation from 90 volts to 520 volts. Each transformer is cooled by a fan. At full load with 420 volts at the terminals the motors take 2700 amp. The transformers supply current at 118 volts for the auxiliary motors and at 325 volts for the heating apparatus.

Each transformer carries integral therewith the voltage step switch, the contact points of which are directly connected with the low-tension steps of the transformer. In accordance with its position for the time being, the main cylinder connects two consecutive pressure stages with the two sides of an auto-transformer, the center of which is connected by way of its corresponding low-tension switch to one of the motor cables. On the 2000-hp locomotive No. 121 this voltage control was in service for 3720 miles before it became necessary to clean and adjust the contacts. During this run the locomotive had to perform very extensive switching service which required much hard usage of the switches. The actual breaking of the circuit is limited to a few carbon contacts of the auxiliary cylinder which is fitted with magnetic blow-outs.

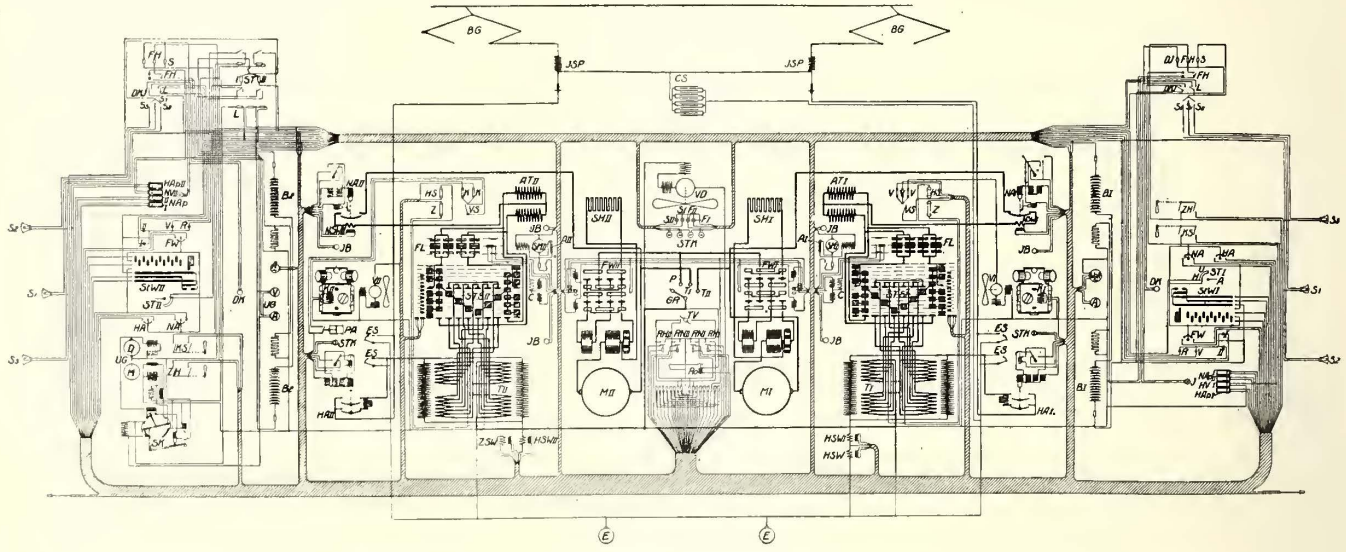
The step switches of the controller are constructed for distant and hand operation. They consist principally of a main cylinder, auxiliary cylinder and driving gear. The main cylinder, which, as already mentioned, is connected with the voltage taps of the transformer, connects the corresponding currents on the auto-transformer. The auxiliary cylinder has a magnetic blow-out and effects the making or breaking of one or the other of the auto-transformer circuits so that the changing over of the circuit, which is effected by the main cylinder, may be carried out while the current is cut off. The driving gear consists of a small d.c. servo-motor which by the aid of a worm gear with crank drive sets a contactor mechanism into swinging motion. The contactors themselves are controlled by small magnets which can be excited from the engineer's stand. According as one or the other of the contactors is actuated, the controller cylinder revolves in the one or the other direction; that is to say, it is switched to a higher or lower voltage stage.

The controllers and the low-tension oil switches, already mentioned, are constructed for a maximum motor current of about 3600 amp. They can be switched on or off by hand as well as electrically from the engineer's stands. Between each of the low-tension oil switches and the motors a shunt is inserted to feed the maximum cut-out of these switches and the ammeter of the motors.

The two motors, which are rated at 1250 hp each on a one-and-one-half-hour basis, are of the compensated-series type with interpoles. Their weight, including the gearing, is 14 tons each. The motor drives by means of a double helical cut gear of 1:2.23 ratio a counterbalanced jack-shaft. The cranks on both ends of these jack-shafts are coupled to the cranks of the driving wheels by means of a triangular yoke. In this drive non-spring-mounted masses are almost entirely avoided. The vertical play between the jack-shafts and wheels is absorbed at the middle driving axle by a vertical sliding block or Scotch yoke.

Table I—Summary of the General Wiring Diagram

High-tension Equipment	
BG	Current collectors
CS	Condensers
ES	Grounding switches
JSP	Induction coil
HA I & II	High-tension switches
T I & II	Main-current transformers
HSW I & II	High-tension shunts
HSW	High-tension shunt to the wattmeter
E	Grounding sliding rings
Low-tension Equipment	
STS I & II	Controller
AT I & II	Auto-transformer
NSW I & II	Low-tension shunts
NA I & II	Low-tension switches
M I & II	Driving motors
SH I & II	Shunt to the driving motors
FW I & II	Driving direction reversers
GR	Group switch
Instruments	
UG A & V	Voltmeter and ammeter for the motor generator group
A	Ammeter for train heating
WATT	Wattmeter for total capacity
NAP I & II	Ammeter for traction motor current
HAP I & II	Voltmeters for high tension
Auxiliary Machinery	
UG with M & D	Motor generator group with motor and generator
SK	Automatic starting switch box



Lötschberg Locomotives—Diagrammatic Scheme of Connections

B 1 & 2	Battery groups and fuses
K I & II	Compressors
PA	Automatic compressor device
V I & II	Transformer fans
VD	Ceiling fan
SM I & II	Servo-motor for the controller
A I & II	Starter for the servo-motors
K	Fuse for compressors
V	Fuse for fans
HS	Fuse for 118-volt auxiliary service
KS	Compressor switch
VS	Fan switch
C	Shunt resistances
Control Equipment	
STW I & II	Controller drum of the step controller.
ST	Controller current main switch and fuse
ST I & II	Controller current switch with current collector valve with positions "Off," "Down," "Up"
HA	Auxiliary switch for high-tension switch
NA	Auxiliary switch for low-tension switch
FW	Switch for reverser
V & R	Signal lamps for "Forward" and "Backward"
TV	Door lock of the motor room
RH 1 & 2	Maximum relay for high-tension switch
RN 1 & 2	Maximum relay for low-tension switch
RO	Zero pressure relay
Heating and Lighting Equipment	
Z	Fuse for train heating
ZSW	Shunt for train-heating fuse
ZH	Train-heating switch
FH	Engineer's cab heater and fuse
L	Main lighting fuse and switch
STK	Coupling plugs with fuse
I B	Interior lighting with fuse
S, S1, 2 & 3	Signal lamps with fuse
D K I	Reverser for ceiling and instrument lamp
DK	Ceiling lamp
I	Instrument lamp

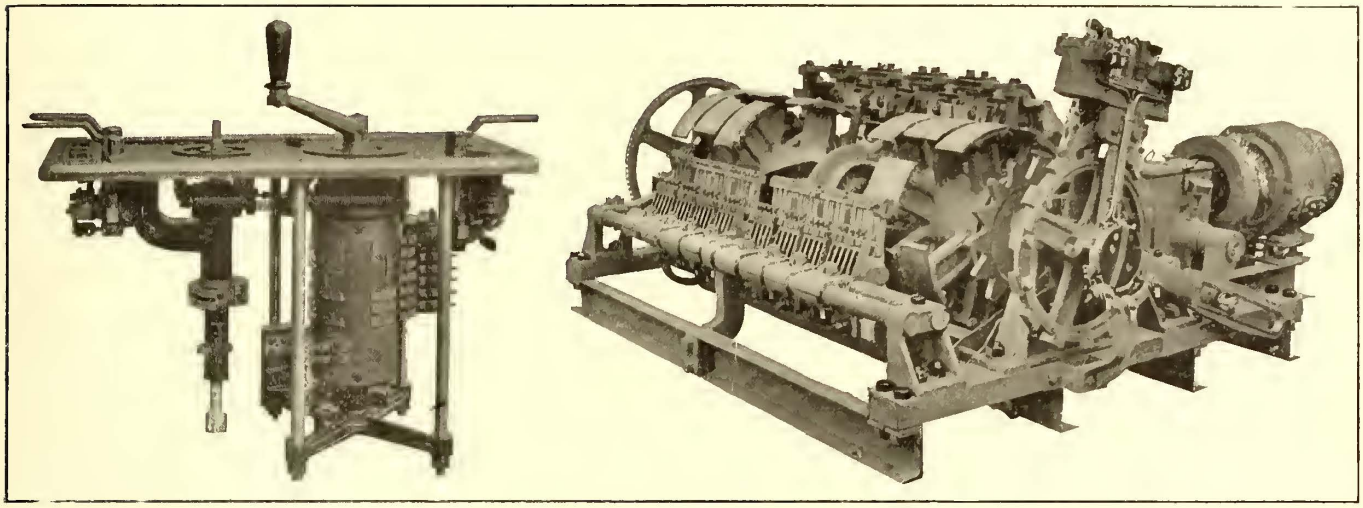
The motors have sixteen poles and are of open construction so that they are practically self-ventilating. Their auxiliary fields give sparkless running even without resistances. The air gap between armature and stator is 0.15 in. (3 mm). All the windings of the stator and rotor are made of mica-insulated copper strap. The brush holders are set on a revolving ring to permit easy inspection of the lower brushes. The motors are built for a maximum voltage of 500 volts and take about 3000 amp at their maximum capacity. The motor room is ventilated by a ceiling fan which is placed above the motors. This fan drives the discharged air through the commutating pole shunt resistors, which are likewise built into the roof in order to cool them thoroughly by constant air circulation.

Aside from the favorable starting conditions which make this locomotive desirable for switching as well as for regular service, it offers a further advantage by its practically complete independence of periodicity and of any speed limitation on account of synchronous speed. The normal speed of the locomotive is obtained at four times the synchronous motor speed. The tractive effort and speed of the motor also ranges within wide limits independent of the line voltage, for on one hand care has been taken to compensate by suitable transformer taps any considerable decrease of line voltage, while on the other hand the motor can develop its full torque at a third of its normal voltage. Owing to this fact the motors also possess an enormous overload capacity at normal voltage.

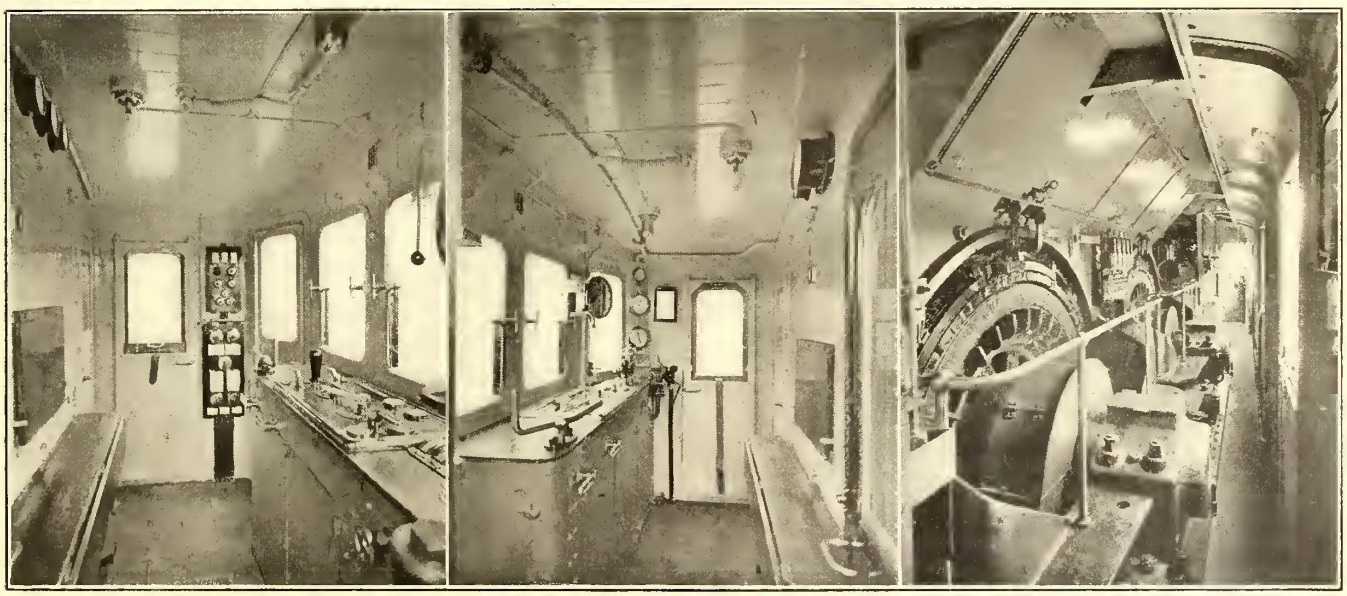
The power factor (cos θ) of the motors at all normal speeds is about 95 per cent. During trial runs the efficiency of the locomotive proper (transformer, motor, gearing) up to the wheel circumference has been found to be as high as 88 per cent. The characteristic curves of one of these motors are presented in an accompanying illustration on the next page.

The reverser is directly connected mechanically and electrically. The reverser drum alters the direction of the flow of the current in the exciter winding and is operated by d.c. magnets from the engineer's stand. In exceptional cases these magnets as well as all other contrivances can be operated by hand. The group switch is installed above the motors and between the two reversers. This switch permits the instantaneous connections of the two halves of the electrical equipment without any tools whatsoever.

A motor-generator set jointly with four ordinary train-lighting batteries supplies the direct current for distance control and lighting. After the motor and generator switches have been cut in by the engineer, all further



Lötschberg Locomotives—Motorman's Master Controller and Main Controller

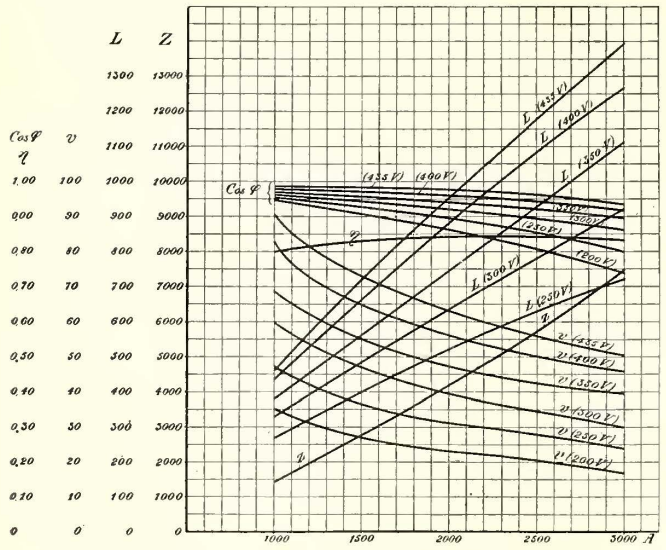


Lötschberg Locomotives—Views of Engineers' Cabs and of Main Motors

alterations in the connections, such as paralleling with the batteries, are made by an automatic starter.

MOTORMAN'S CABS, HIGH-TENSION ROOMS, ETC.

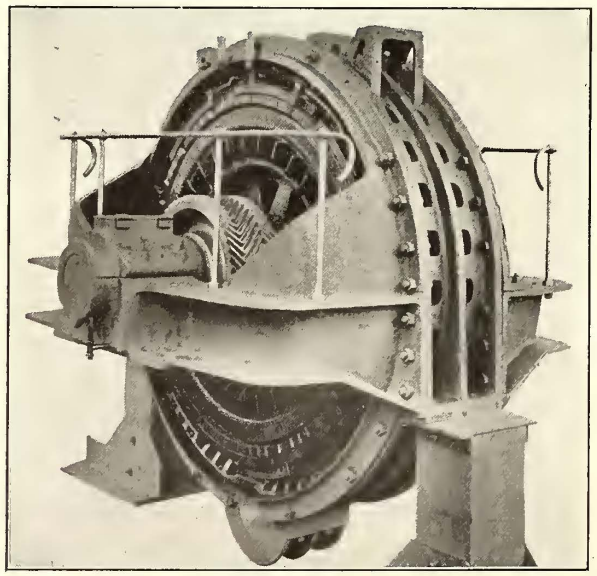
Each motorman's cab contains the air-valve mechanism for operating the current collectors, two switches for operating the high-tension and low-tension oil switches, main controller handle by means of which the step contacts are manipulated, reverser at the right of the controller, signal lamps which show the engineer the running direction of the machinery, and two lamps which light up as soon as the contactors stand in the zero position. All switches are so interconnected, either electrically or mechanically, that wrong manipulations are possible. The cabs are also fitted with numerous measuring instruments, those over the engineer's benchboard being of the profile type.



Z = tractive effort in kg; v = speed; L = horse-power.

Lötschberg Locomotives—Performance Curves of 1250-hp Single-Phase Motor

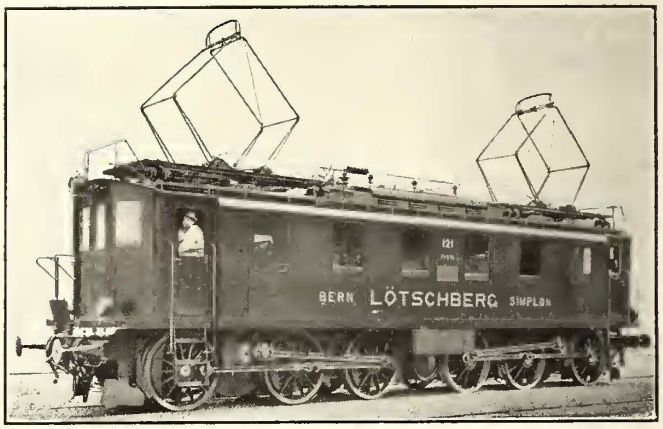
The two high-tension compartments in the motor room are shut off by doors of wire netting. These doors are so



Lötschberg Locomotives—1250-hp Single-Phase Motor with Helical Gearing

locked that prior to their being opened the high-tension conductor before and behind the high-tension oil switches must be grounded. The key which is necessary for the release of this lock is attached to the current collector valve conduit in such fashion that it can be taken off only when the collector valve is open, thus compelling the escape of any air in the conduit. With this key all the doors of the individual high-tension compartment can be unlocked, but it can be taken out of the lock only when all the doors are closed. This arrangement renders it impossible to open the high-tension compartment while the equipment is alive.

The door of the fan chamber attached above the motor is also locked, but it must be opened if the reversers or the group switches have to be operated by hand. In this event, the door can be opened only when the bar, which also serves as a switch, has been turned. As this switch closes the circuit of the four oil switches, reversing by hand is possible only when the current is switched off. The cab signal lamps are duplicated here to guide the operator in case it is necessary to operate by hand.

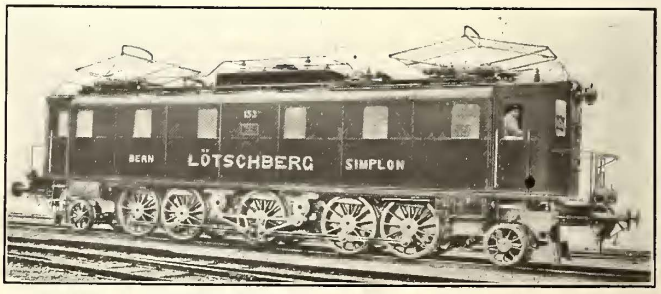


Lötschberg Locomotives—Original 2000-hp Design, in Service Since 1911

Table II—Tabulated Data

Current system	Single-phase alternating current
Normal line voltage	15,000 volts
Periodicity	15 cycles per second
Rail gage	4 ft. 8½ in.
Maximum grade	2.7 per cent.
Total length of locomotive measured over buffers	52 ft. 6 in.
Total length of wheelbase	37 ft. 2 in.
Fixed wheelbase	14 ft. 9 in.
Diameter of driving wheels	53 in.
Diameter of pony wheels	33 in.
Diameter of crank circle	24 in.
Ratio of tooth gear	1:2.23
Weight of the mechanical part	47.3 metric tons
Weight of the electrical part	59 metric tons
Total weight	107 metric tons
Weight available for adhesion	78.2 metric tons
Maximum pressure on axle	16.6 metric tons
Capacity on 1½-hour basis	2500 hp
Tractive effort at the wheels on 1½-hour basis	29,700 lb.
Speed on 1½-hour basis	31 m.p.h.
Maximum speed	46.5 m.p.h.
Maximum tractive effort at starting	39,600 lb.

The folding ladder which is used to obtain access to the roof has been fitted with an alarm whistle which blows if any compressed air should be left in the current collector conduit when the ladder is being let down.



Lötschberg Locomotives—One of the Thirteen 2500-hp Single-Phase Locomotives

The accompanying Tables I and II present the key to the wiring diagram and the principal mechanical and electrical data of these locomotives.

Valuation of Toronto Public Utilities

Report of Bion J. Arnold and J. W. Moyes Regarding Franchises and Other Assets of Toronto Railway and Radial Lines Submitted to Mayor Hocken

In the ELECTRIC RAILWAY JOURNAL of Oct. 18, 1913, and Oct. 25, 1913, brief mention was made of the progress of negotiations in regard to the purchase of the Toronto Railway by the city of Toronto and also of the reports of Bion J. Arnold and J. W. Moyes, experts appointed to appraise the railway property. The complete reports presented by Mr. Arnold and Mr. Moyes dealt with the following properties: (a) the Toronto Railway; (b) the Toronto & York Radial Railway, and (c) the Toronto Suburban Railway. All of the street railway property of the Toronto Railway was considered in the appraisal. With respect to the other two railways, however, the valuations determined included the property of those companies lying in or upon the streets within the present city limits of Toronto and covered solely those portions of the track and electrical distribution system so situated. The work of the appraisers consisted mainly of an investigation of the cost new and present value of the physical property of the railway considered as of July 1, 1913, together with a study of the operation of the properties with the view of determining other elements of value, such as the companies' contractual rights under existing franchise ordinances expiring in general on Sept. 1, 1921.

DEFINITIONS

The "cost to reproduce new" as used in the report represents the cost that would be incurred in replacing as of July 1, 1913, the physical property as found with new property of similar character. The "present value" of the physical property, or the "depreciated value," as used in the report, means the cost to reproduce new less the accrued depreciation on a straight-line basis. The "intangible value" is intended to signify those other elements of value which attach to the physical properties in view of the contracts now existing between the city and the company, or to represent the monetary value to the railway of its right to continue its operation until its existing franchise agreements, with the various stipulations thereof, shall terminate.

In arriving at the value of the properties their extent, character and present condition were considered, together with their earning power, past and prospective, the amount of operating expenses and the character of their service. The fact that they are operating in the limited territory which the major company is required to serve under its existing franchise was also considered, as well as the character and facilities of the property for rendering the class of service to which the public is entitled both now and in the future.

After full consideration of the above elements, the value of the properties, including the remaining operating rights and attached business, was found to be as shown in Table I.

REPRODUCTION COST NEW

In arriving at the cost to reproduce new a complete physical examination and general inventory were made of all the properties. Appropriate unit prices were used to arrive at the construction cost of the property as found and were checked by means of prices paid by the street railway, prices paid by the city for its municipal railway property and also prices quoted by manufacturers.

To the base cost of the various items of property there were added varying percentages to cover the expenses of organization, engineering and incidentals. The percentage added for organization covers the cost of general office expenses, securing bids, preparing contracts, purchase of materials, salary of officials chargeable to construction and general superintendence and legal expenses chargeable to construction. The percentage added for engineering covers the cost of preparing working plans, specifications and contracts, supervision, progress reports, estimates for payment, together with expense of shop inspection, tests and field engineering. The percentage added for incidentals covered all incidental construction expense to the company that was outside of the contract cost, such as extras in the contract price, due to small changes in design, additional expense due to interference with construction for various causes, the cost of trial operation, the cost of insurance and operating expense during construction.

The percentages included under organization, engineering or incidentals or their equivalents vary from a minimum of 5 per cent in certain exhibits to a maximum of 15 per cent in other exhibits, and for the whole property the average amounts to 6.4 per cent. The total obtained after adding these percentages to the physical value represents the actual cash that would be required in reproducing the property new but does not include the cost of obtaining the money necessary to finance the property, such as brokerage, bond discount or the carrying charges during construction, including taxes and interest, or legal expenses not properly chargeable to construction incurred in initiating the enterprise. The overhead percentage allowed for these items was 5 per cent, of which 3 per cent represents the carrying charges and 2 per cent the general legal and financing expense. The total cost thus determined includes no development expense or promoter's profit.

TABLE I, SHOWING APPRAISED VALUES

(a) The Toronto Railway:	
Present value of the physical property as of July 1, 1913	$9,894,483
Intangible value of the property as of the same date	10,713,553
Total value of Toronto Railway	$20,608,036
(b) Toronto & York Radial Railway:	
Present value of the physical property of the Metropolitan Railway division	$64,304
Present value of Toronto & Scarboro Railway division	27,300
Total present value of the physical property	$91,604
Intangible value of the Metropolitan Railway division	193,694
Total value of the Toronto & York Radial Railway	$285,298
(c) Toronto Suburban Railway:	
Present value of the physical property	$51,144
Total value of the Toronto Suburban Railway, including light, heat and power franchise	$51,144
Total value of Toronto Railway and those portions of the radial railways within the present city limits	$20,944,478

PRESENT VALUE

The present value of the physical property was determined by depreciating the cost to reproduce new of all the various items of property. Varying rates of depreciation, such as were mentioned in detail in the ELECTRIC RAILWAY JOURNAL of Oct. 25, 1913, page 942, were applied to various classes of physical property with a proper consideration of salvage value. Certain exhibits, such as stores and the land value of real estate, were not depreciated, the cost new value being considered the present value. The present value of the cost of securing money was obtained by depreciating its original value in the ratio of the elapsed life of the franchise. Legal expenses, carrying charges and incidentals were not depreciated, since in rehabilitation such expenses would be charged to operation.

INVENTORY

For the purpose of making an inventory the property was divided into the following general divisions: (1) track; (2) electrical distribution system; (3) rolling stock; (4) power plant equipment; (5) shop equipment and tools; (6)

furniture and fixtures; (7) real estate and buildings, and (8) stores. Each exhibit was in turn subdivided into various parts as needed.

INTANGIBLE VALUE

In arriving at the intangible value of the properties examined, the following facts were considered. Under the terms of the franchise agreement the railway company has a practical monopoly until Sept. 1, 1921, to operate a street railway system upon and along the streets within the city limits of Toronto as they existed Sept. 1, 1891. Under this agreement the city does all paving and furnishes the track foundation, the company furnishing only ties, rails and fastenings. For the use of this track foundation the company pays the city $800 per mile of single track per year. Moreover, under the existing agreement the railway company is required to pay to the city a certain per cent of the gross receipts from railway operation. After deducting these payments and the usual operating expenses, the net receipts are decreased further by a 5 per cent charge on the capital investment. The net amount represents the profit of the company. The present value of this amount each year for the remaining term of the agreement was taken by Messrs. Arnold and Moyes as the intangible value of the property.

Certain conditions in the agreement between the city and the Toronto Railway tend to reduce materially the expense of operation, so that the unusually low operating ratio of 53.4 per cent for 1912 was found. This ratio is exclusive of the payment to the city for taxes and for pavement charges, both of which items would be included in the operating ratio of the average company. If these two items, amounting to $143,000, are added to the reported operating expense of $2,866,550, the operating ratio becomes 55 per cent. The payment of the Toronto system to the city of Toronto for taxes, independent of franchise taxes on gross earnings, is but 0.95 per cent of the gross income, whereas the report states that the average percentage of the gross income paid by fifteen of the largest traction companies of the United States is 6.35 per cent. The expenditure of the company for damages and injuries is approximately 2 per cent of its gross revenue, whereas the average amount is stated to be 5.35 per cent of the gross revenue. The payment of $800 per single-track mile to the city of Toronto for the maintenance of the paving and paving foundations is less than the actual cost of maintaining and renewing the work. Estimates made by the appraisers based on a city report show a yearly expenditure of $1,150 for depreciation of paving and paving foundations and $104 for maintenance, meaning a saving of approximately $450 per mile per year, or approximately 1 per cent of the gross earnings. Then, too, the Toronto Railway Company has accumulated its renewal fund by charging it against surplus rather than including it as an item of operating expense. For the year 1912 approximately $200,000, or about 4 per cent of the gross revenue, was thus set up. The total of these four adjustments is 13.7 per cent of the gross revenue, giving an operating ratio comparable to that of the average company of 68.7 per cent. In view of these facts, the appraisers deemed it proper under the existing franchise conditions to use the modified operating ratio of 55 per cent in determining the net receipts from operation.

After a study of population conditions in Toronto, Messrs. Arnold and Moyes determined upon a rate of population increase of 5 per cent compounded for the five years from 1913 and 4 per cent compounded for the remaining years of the franchise. On the basis that the ratio of the gross earnings in given years is proportional to the square of the ratio of population in the same years, the increase in earnings for the next five years is 10 per cent and for the remaining years of the franchise 8 per cent. In view of the fact, however, that if the city does not purchase the Toronto Railway, a competing subway may be built, the rate of increase in earnings was decreased by the investigators to 10 per cent for the first three years, 8 per cent for the succeeding three years and 6 per cent for the remaining life of the franchise.

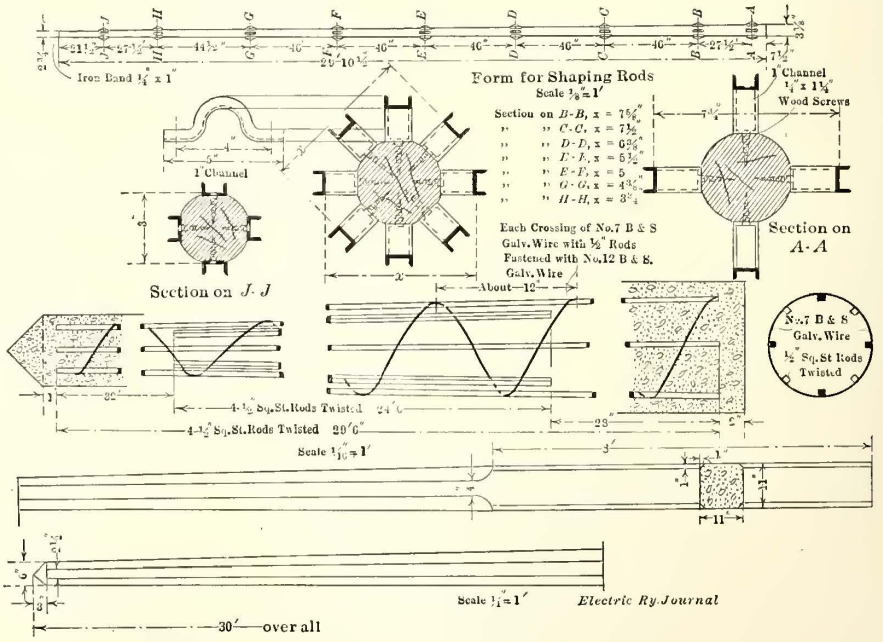
By using these percentages the gross profit was determined for each year, the franchise tax deducted, and the net profit was then discounted from each given year to July 1, 1913. The sum of these present values of future earnings was found to be $15,701,106. Estimating then the additional cars, power plant and substation apparatus and track needed during these years, Messrs. Arnold and Moyes computed an average investment of $887,500 per year. An amount of $4,987,553 was then determined by discounting the interest on the investment paid at the end of each year, leaving a net intangible monetary value of $10,713,553 for the right of the Toronto Railway to do business during the unexpired period of the agreement.

In a message to the Council on Oct. 13 Mayor Hocken expressed his satisfaction with the exhaustive examination made by the experts and stated that he was not prepared to say what the citizens of Toronto would do about the question of municipal ownership, but that when he had received a report concerning the financial outlook for the proposition he would submit the matter in full to the Council.

CONCRETE POLES FOR OAKLAND

The Oakland Traction Company has built a number of reinforced poles with satisfactory results. The pole has an over-all length of 30 ft., with square butt 8 ft. in length and 11 in. square. The reinforcement consists of eight ½-in. square twisted steel rods. Four of these are carried for a length of 24 ft. 6 in. in the pole and the other four for a length of 29 ft. 6 in. The accompanying diagram shows the construction of the pole as well as that of the form on which the reinforcing rods are assembled before they are placed in the mold.

The cost of manufacturing these poles is $12.31 each, including labor and material.



Reinforced Concrete Poles—Oakland Traction Company

Approximate Predetermination of Train Energy

This Method Is Based Upon Simple Dynamical Principles, Using a Series of Empirical Factors Which Vary According to the Speed, Number of Stops and Character of Service

BY W. A. DEL MAR AND D. C. WOODBURY

The predetermination of energy consumption by cars or trains is usually effected by means of a method which conceals the simple dynamical principles involved. Such a method is necessary where great accuracy is required, as it is only by dealing in electrical units that the characteristics of a particular electrical equipment can be brought to bear upon the solution of the problem. The following method neglects the peculiarities of the electrical equipment by assuming that it has certain average characteristics computed from the results of actual runs and expressed as dynamical rather than as electrical factors.

This method depends upon the fact that the energy required to propel a train is made up of three parts:

(1) That required to overcome inertia.

(2) That required to overcome friction, i.e., train resistance.

(3) That required to overcome gravity on grades. With this latter quantity is usually associated the extra frictional energy consumed on curves.

If the maximum speed v and the mass m of the train are known, the first element of energy may be calculated by the dynamical equation,

$$\text{Energy} = \tfrac{1}{2}\, mv^2.$$

If the distance L_p traveled with power on and the train resistance r are known, the second element of energy may be calculated by the dynamical equation

$$\text{Energy} = rL_p.$$

If the height, h, the train is lifted while power is on, and its weight, w, are known, the third element of energy may be calculated by the dynamical equation

$$\text{Energy} = hw.$$

The sum of these elements of energy is the total energy required to run the train, disregarding the losses between the current collector and the rim of the drivers.

Thus far only simple dynamical principles have been stated. They are difficult to apply in practice because the maximum speed and the distance traveled with power on are usually unknown. The quantities usually known are the average speed and the total length of run. The peculiarity of this method consists in the use of a series of factors which give the maximum speed and distance run with power on, in terms of the average speed and total length of run respectively. These factors have been derived from a large series of actual and calculated runs on street railways, interurbans and trunk lines, both passenger and freight. A practical application follows:

Let V = Average running speed, excluding stops, in m.p.h.

V_m = Maximum speed, in m.p.h.

L = Distance between stops, in miles.

L_p = Distance traveled with power on, in miles.

$n = \frac{1}{L}$ = Number of stops per mile including one terminus.

r = Average train resistance, in pounds per ton. (Say that corresponding to a speed of 10 to 20 per cent greater than the average speed.)

G = Average equivalent grade, in per cent.

g = Average curvature, in degrees.

e = Average motor and controller efficiencies as a decimal, which is usually about 0.7.

$K = \frac{V_m}{V}$. (See table below.)

$Q = \frac{L}{L_p}$. (See table below.)

The average equivalent grade, in per cent, may be obtained by the following formula, which assumes only one-half the gravitational energy on down grades to be saved, the remainder being consumed in braking. Other assumptions may be found necessary in certain cases:

$$G = \frac{100}{D}(H_1 - \tfrac{1}{2}H_2)$$

where

D = distance between stops, feet = 5280 L;

H_1 = summation of rises in feet;

H_2 = summation of falls in feet.

TABLE I—OUTPUT AT WHEEL RIM AND INPUT TO CAR IN WATT-HOURS PER TON-MILE

	Actual Energy Output at Wheel Rims of Cars	Approximate Electrical Energy Input to Cars
Due to kinetic energy.....	$\frac{V^2 m}{36.2L}$	$\frac{K^2 nV^2}{25}$
Due to train resistance.....	$\frac{1.99rL_p}{L}$	$\frac{2.85r}{Q}$
Due to grades	$\frac{39.8GL_p}{L}$	$\frac{57G}{Q}$
Due to curves.....	$\frac{1.99gL_p}{L}$	$\frac{2.85g}{Q}$
Total	Sum of above	Sum of above

In this table the first column gives the exact mechanical energy required at the wheel rims, except in the case of that required to overcome curves, and the second column the approximate electrical input. The difference is partly due to an allowance of 70 per cent for the efficiency of the motors, gears and control. The formulas in the first column furthermore make use of the fundamental quantities V_m and L_p, while those in the second column employ the approximate factors K and Q from Table II. In cases where V_m and L_p are known, more accurate results can be obtained by using them.

TABLE II—VALUES OF K AND Q

Stops per Mile n	K: Locomotive Passenger Trains	K: Single Cars, Multiple-Unit Trains and Freight Trains	Q All Trains
0	1.00	1.00	1.00
0.1	1.18	1.10	1.11
0.2	1.35	1.18	1.24
0.3	1.48	1.25	1.38
0.4	1.60	1.31	1.52
0.5	1.68	1.36	1.67
0.6	1.75	1.40	1.78
0.7	1.82	1.44	1.89
0.8	1.86	1.47	1.99
0.9	1.90	1.50	2.07
1.0	1.93	1.52	2.15
1.2	1.93	1.56	2.24
1.4	1.93	1.59	2.34
1.6	1.94	1.62	2.44
1.8	1.94	1.65	2.52
2.0	1.95	1.68	2.58
2.5	1.95	1.75	2.71
3.0	1.96	1.80	2.81
3.5	1.96	1.85	2.87
4.0	1.97	1.90	2.91
4.5	1.97	1.94	2.95
5.0	1.98	1.97	3.00
Over 5.0	2.00	2.00	3.00

The values of K, the ratio of the maximum to the average speed, depend upon the shape of the speed-time curve. If the run is very short, consisting only of an acceleration period and a breaking period, as shown by Curve A, Fig. 1, the speed-time curve is triangular and $K = 2.00$. On the

other hand, if it were possible for the speed-time curve to be rectangular, as with instantaneous acceleration and braking, the value of K would be 1.00, as may be seen from Curve B, Fig. 1. All values of K lie between these limits.

The values of K for locomotive passenger trains are higher than those for single cars, multiple-unit trains and freight trains because the speed-time curve of the former is more triangular than that of the latter. The locomotive

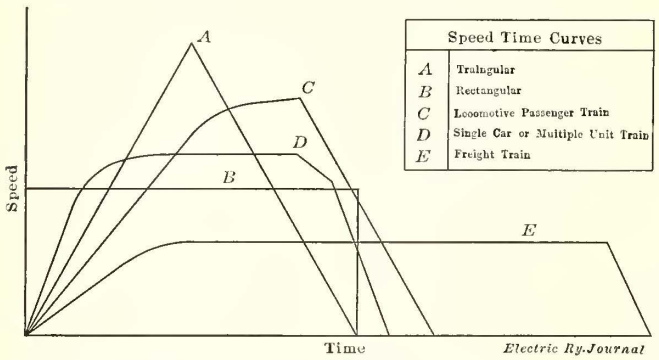


Fig. 1—Calculation of Train Energy—Characteristic Speed-Time Curves

passenger train has a rather low acceleration which continues to a high maximum speed, as shown by Curve C, Fig. 1. The run at maximum speed is comparatively short before braking, which is accomplished at a moderate rate, so that the general shape of the speed-time curve approaches a triangle. Single cars and multiple-unit trains have a high acceleration, a comparatively long run at a moderate maximum speed and a quick stop, as shown by Curve D, Fig. 1, which gives a more nearly rectangular speed-time curve. The freight trains have a low acceleration, but get the rectangular characteristic of their speed-time curve by running for a considerable portion of the run at a low maximum speed, as shown by Curve E, Fig. 1.

The values of Q, the ratio of the distance between stops to the distance run with power on, do not lend themselves so well to discussion. Obviously Q cannot be less than 1.00, and it seems to be limited, by observations of actual and calculated runs, to a maximum of about 3.00. This means that for very short runs the acceleration period covers one-third of the distance, the coasting and braking periods covering the other two-thirds. The variation in Q for

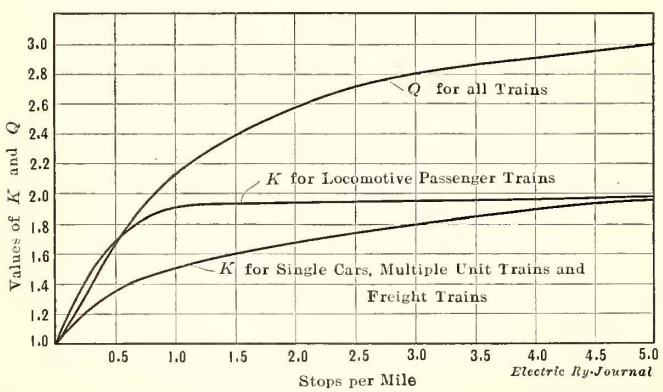


Fig. 2—Calculation of Train Energy—Values of Factors K and Q

actual runs is likely to be greater than in K, but Q is of less importance under average conditions of grade, as it enters only the less important items and is used only in its first power, while K is squared and enters into what is usually the largest item, that is, the kinetic energy. Plots of K and Q are shown in Fig 2.

The authors lay claim to no finality in the table of values of K and Q. On the contrary, it is very likely that with a greater amount of data on train runs more complete tables may be prepared, taking into account a greater variety of service and equipment.

Example:

A multiple-unit train makes an average speed, while running, of 30 m.p.h., making a stop every 2 miles. The average train resistance is 7 lb. per ton, the average equivalent grade 0.05 per cent and the average curvature 0.75 deg.

Then $V = 30$

$r = 7$

$G = 0.05$

$g = 0.75$

$n = 0.5$

$K = 1.36$, $Q = 1.67$ } from Table II.

Then,

	Watt-hours per Ton Mile
Kinetic energy $= \frac{1.36^2 \times 0.5 \times 30^2}{25}$	$= 33.3$
Train resistance energy $= \frac{2.85 \times 7}{1.67}$	$= 12.0$
Energy for grades $= \frac{57 \times 0.05}{1.67}$	$= 1.7$
Energy for curves $= \frac{2.85 \times 0.75}{1.67}$	$= 1.3$
Total energy input at train	$= 48.3$

In calculating runs by the step-by-step method, since the values of V_m and L_p will be known, the formulas in the column of Table I headed "Actual Energy Output" will be found useful for checking the results. The difference between the energy by the two methods will then represent the losses in the electrical equipment and should be of reasonable magnitude, say 20 to 40 per cent. If the losses are either excessive or unusually low, there is likely to be an error in the complicated step-by-step calculation.

This method has been found very useful in making electrification estimates, as it enables load diagrams to be plotted from given schedules before the exact details of the motor equipment are settled.

There are usually so many indeterminate factors in a train run that the accuracy of the step-by-step method is often wasted. The new method is very simple to use, as all the formulas are adapted to slide-rule calculation, using only such fundamental quantities as train weight, distance run and time of run.

FIRST FALL MEETING OF NEW ENGLAND STREET RAILWAY CLUB

The first fall meeting of the New England Street Railway Club was held at the American House, Boston, on Oct. 30 with President Wilde in the chair. After the usual dinner, which was enjoyed by about 100 members and guests, twenty new members were elected. Louis D. Gibbs, superintendent of advertising of the Boston Edison Company, then delivered an address, "Public Service for Public Comfort." The speaker sketched the possibilities of closer relations with employees and the public, emphasizing the opportunities in the direction of cultivating public sentiment by giving a more ready ear to complaints and by affording patrons the opportunity to become personally acquainted with company officials. Friends are made by a proper reception of complaints and suggestions. In closing, the speaker voiced the value of cleanly and courteous employees. He stated that labor troubles never arise from such sources and urged the cultivation of a high-class operating personnel as a factor in making over public sentiment.

The rest of the evening was devoted to an informal discussion of the recent Atlantic City convention of the American Electric Railway Association.

Electric Railway Car Lighting

The Writer Outlines the Requirements for Good Illumination in Electric Cars, Discusses the Advantages of Reflectors and Considers the Possibilities of Indirect Lighting

BY J. R. CRAVATH

In view of the attention which has been devoted in the last few years to the lighting of rooms and streets, it is rather notable that so little study has been given to the lighting of electric railway cars. In fact, the lighting of steam railroad cars has received, on the whole, more scientific thought than has been given to illumination in electric cars. One reason for this has probably been the comparative cheapness of electric energy for lighting on electric railway cars. Most electric railway officials have probably considered that there is no special problem connected with electric railway car lighting except to get enough lamps and maintain them at a voltage that will keep the car sufficiently lighted at all times during its operation at night. In fact, on many interurban roads the problem of maintaining sufficient voltage to prevent serious fluctuations in the light is so great that it has overshadowed all others. Interurban managers have rightly felt that it was useless to give much consideration to the fine points of car lighting until the problem of voltage fluctuations was answered. This problem has not been satisfactorily solved at the present time for interurban roads which have insufficient feeder capacity, because all of the methods for overcoming this difficulty appear to involve too much expense or complication to make them popular.

Electric Railway Car Lighting—Interior of Car with Lamps Over Seats

Electric Railway Car Lighting—Typical Unsatisfactory and Inefficient Lighting Arrangement

It is the purpose of this article to state some of the principles which must be followed in the artificial lighting of electric railway cars if the illumination is to be made comfortable for the passengers. Right here it is in order to call attention to the fact that considerable money and thought have been expended on the details of interior equipment and arrangement of electric cars to make them as comfortable as possible as to seats, ventilation, etc., and it is certainly just as important to make the illumination adequate. Ideas of what constitutes adequate and satisfactory interior illumination have advanced very rapidly in the past five years. Passengers who have become accustomed to proper interior lighting arrangements in homes and offices will not be satisfied much longer with the crude methods in use on most electric railway cars.

QUANTITY OF LIGHT

The first requirement is to provide the passenger with sufficient light for reading a newspaper in almost any position in the car without annoying shadows. To do this, the common practice of spacing lamps at frequent intervals, with one row over each row of seats, as in the accompanying diagram, answers the requirements better than anything else yet proposed. It not only takes care of the passengers in the seats but of those who may be standing in the aisles. The frequency of lamp spacing now commonly employed is sufficient to avoid troublesome shadows. In a cross-seat car this frequency of spacing should be not less than one lamp for every two seats.

TYPE OF LAMP

The next question is as to the kind of lamp and its equipment. To many electric railway men, doubtless, the only problem in the illumination of electric railway cars has been that of the kind of lamp to adopt; that is to say, whether to retain the old carbon-filament lamp or to adopt some recent lamp with a metal filament, such as tungsten. While this is a problem in economical operation, it has very little to do with passengers' comfort, provided an equal total flux of light or candle-power of lamps is used in each case.

THE QUESTION OF REFLECTORS

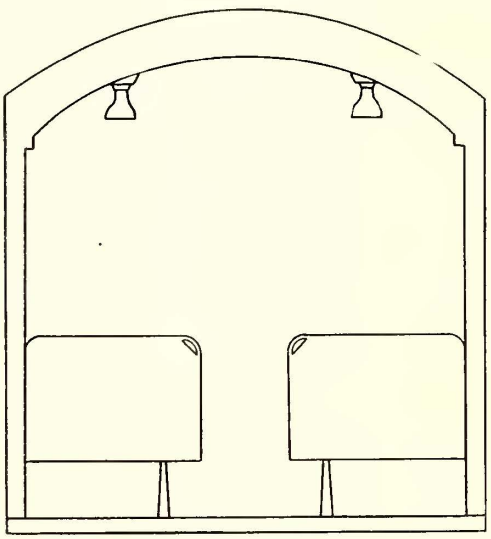
Common practice is to place a row of lamps over each seat, as shown in one of the accompanying views, or perhaps some over the aisles, as shown in the other view. These lamps have clear glass bulbs and are equipped with no globes or effective reflectors of any kind, as the flat reflector in the car with center illumination is of little use. Electric railway men have generally fought shy of reflectors, for various reasons. Among them may be enumerated the following: The reflectors or shades have frequently been of a kind which were difficult to keep clean and if not properly cleaned gave the car a very unkempt appearance. The reflectors used have frequently been of poor design so that they did not direct the light down in the car as they should. Frequently they have been of thin glass, easily broken and a constant source of annoyance and expense through break-

age. The shade holders used to hold the reflectors have frequently been flimsy and of improper design to hold the reflectors rigidly, with the result either that the reflectors in the cars would usually be found tipped at various angles or, if the shade holders were fastened directly to the lamp sockets, the weight of the shade would pull the socket to pieces on account of the constant jar. All of these are real troubles which the operating man has experienced, and it is not surprising that he raises objections to the use of reflectors, especially when one considers what has been offered him for use in the past.

Nevertheless, with proper design of reflectors, so that they really accomplish what is wanted in distributing the light, together with proper mechanical design of the reflector holder, and with a reflector having a surface which is easily cleaned, all of these objections can be overcome, and there are substantial advantages in the use of reflectors.

ADVANTAGES OF REFLECTORS

These advantages in the use of proper reflectors relate both to economy in the use of light and to the comfort of the passengers. A properly designed reflector will direct downward toward the passengers and their newspapers a



Electric Railway Car Lighting—Diagram Showing Correct Arrangement of Lamps

considerable amount of light which would otherwise be wasted against the walls and ceilings of the car or by shining out of the windows. All of the ordinary types of incandescent lamps are so constructed that a very large percentage of the light flux—that is, the total light emanating from the lamp—is given off in directions within 30 to 40 deg. above and below the horizontal when the lamp is hung in a vertical position. This being the case, it will be seen that lamps placed nearly vertical, as they usually are in an electric car, throw a large percentage of the light against the upper walls and windows of the car. Of course, some of this light is reflected toward the surfaces which it strikes, but all these surfaces absorb considerable light, and the waste in the aggregate is large. By the use of reflectors of proper design much of this waste can be utilized.

A still more important reason for the use of reflectors, however, is the comfort of passengers. The type of reflector which should be used in car lighting of this kind will be deep enough, as shown in the diagram, so that the tip of the lamp comes about even with the bottom of the reflector. The reflector will be of opal or other glass which is dense enough to prevent an undue amount of light going through the reflector but at the same time will be sufficiently translucent to light up the upper part of the car cheerfully. The greater part of the light, however, will be directed down. The effect of such reflectors will be to diffuse the light so that passengers looking the length of the car will see no lamp filament but will see only the soft, diffused light coming through the reflectors. In other words, the reflectors will shade the lamps comfortably and send the light down in the car where it is most needed.

THE NEED FOR A GOOD REFLECTOR

The electric railway manager should not accept the popular impression that any reflector to which a scientific or catchy trade name is given and which is pushed by enterprising salesmen is the thing to use in an electric car. The fact is that at the present time there is a remarkable scarcity of reflectors and holder equipment which can be considered suitable for use on electric cars. This may seem remarkable in view of the activity of many glass and metal manufacturers during the past five years in catering to the wants of the users of interior lighting equipment. However, some excellent designs of holders have been recently brought out for use in steam railroad cars, and these holders are well adapted to electric railway cars.

The art in the design of suitable reflectors is just now suffering from the lack of initiative and understanding on the part of the larger electric railway companies. The writer has said many times that it is difficult at the present day to introduce any good new article unless the article is patented so that it is to some particular company's interest to advertise and push it. We are so accustomed to use only the things that are forced upon our attention by enterprising manufacturers, advertisers and salesmen that we forget that there may be many unpatented devices which are worthy of attention. When we apply this principle to reflectors thoroughly suitable for use on electric railway cars at the present time, we have the rather remarkable situation that few of them are produced. Electric railway requirements call for something so plain and simple that no manufacturer can get out any very distinctive ornamental design which he can call his own. Consequently nothing is done. Doubtless, also, manufacturers have met little encouragement in bringing out such designs for electric railway cars from the electric railways themselves, because of the old objections to reflectors already given.

What is needed is a correct scientific shape combined with a plain design which can be easily cleaned. Such designs can be obtained by any electric railway company which would use sufficient quantities to justify the expense of the design and the mold. It is not likely to be pushed by manufacturers, however, for the reasons already given. When electric railway companies arrive at the point where they are sufficiently interested to work the matter out, it will be a comparatively easy problem.

INDIRECT LIGHTING

Considerable development has taken place recently along the lines of indirect lighting for interiors, and this type of lighting is generally found where the most thorough study has been given to the illumination. However, this type of lighting is not suitable to electric railway cars, or at least will not be until electric railway companies are prepared to give much more attention to the cleaning of reflectors and will keep car ceilings clean and of lighter color than at present.

Such an indirect lighting system, however, would unquestionably be more comfortable for the passengers than a direct system. As a general principle, the larger the area from which the light comes to the eye, the more comfortable the system of illumination. Thus, in the system of direct lighting, with opal reflectors over each lamp, as outlined in this article, there is more comfort for the passengers than with the bare shaded lamps, because, first, there is less light entering the eyes of the passengers, and, second, the light which enters the eyes comes from and through the diffusing reflectors rather than from intensly bright lamp filaments.

Settlement of Indianapolis Strike

Operation of Cars Resumed After Agreement Is Made to Have Differences Arbitrated by the Public Service Commission of Indiana—Effort to Involve Interurban Lines Is Unsuccessful

A settlement of the strike which practically prevented street railway operation in Indianapolis for seven days was brought about with remarkable expedition on Friday, Nov. 7. The general conditions of the strike were in themselves unusual and may be summarized as follows:

Only a very small number of men had been organized when the strike was called. The city and county officials absolutely failed to give any protection to life or property when the remaining motormen and conductors, who constituted a majority, started to operate cars in the city the morning after the notice to walk out. Riotous mobs, practically controlling the city, dragged men from the cars and forced them to join the union, without any restraint from the authorities. The turbulence lasted for several days, police officers resigning rather than protect the property or employees of the company. State troops were called by the Governor on Thursday morning, Nov. 6, after committees of the most prominent business men of the city had assured him of their hearty approval of this course, and this resulted in a change in the attitude of the labor men, who then indicated willingness to recede from former demands. Finally, as in the case of the Cincinnati strike, a suit for receivership against the company as a means of forcing concessions was commenced. It was generally reported that, while the company was absolutely solvent and living up to the terms of its franchise, if a receiver were appointed he would at once recognize the union and cause the company endless future trouble, in addition to the interruption in business and impairment of credit which usually follows legal complications of this kind.

The suit for appointment of a receiver for the Indianapolis Traction & Terminal Company, filed on Nov. 3 by A. C. Pearson, was annulled on Friday morning, Nov. 7. The company filed a demurrer to the complaint, which was sustained by Judge Remster on the ground that the law provides that such a proceeding should be brought either by the prosecuting attorney or by some citizen who has a special interest in the franchise and property of the company besides the interest of other citizens, and that the plaintiff did not show he had such special interest

In the meantime the Governor was making every effort to bring about some mutual adjustment of the difficulties before declaring martial law and putting in action the three regiments of the State militia quartered in the city. The labor leaders had refused to consider the proposition prepared by the Governor, the Public Service Commission and officials of the Traction & Terminal company, which provided, in brief, that the outside labor agitators should leave the city, that all local charters should be annulled, and that all men should go back to work under the terms of their former employment and after thirty days submit their grievances to the company, and, if not settled, then the matters should be submitted to the Public Service Commission, whose decision should be final. The labor men still held out for recognition of the Amalgamated Association by the company, and the company refused to recede from its position that it would not treat with any union but would treat with the men themselves simply as employees of the Traction & Terminal company.

Additional pressure was brought to bear on the company by the filing of another suit for appointment of a receiver and asking for cancellation of the lease under which the Indianapolis Traction & Terminal Company took over the property of the Indianapolis Street Railway. This suit, in order to overcome the points of invalidity under which the earlier suit was dismissed, was brought by William Dobson, secretary of the Bricklayers, Masons & Plasterers' International Union, as the owner of five shares of stock of the Indianapolis Street Railway. Action in this suit was deferred until Saturday, Nov. 8, and on Monday, Nov. 10, the matter of the appointment of a receiver was indefinitely postponed by the court on the ground that the company was then in full operation of all lines.

In the meanwhile Governor Ralston and the Public Service Commission, in conference with officials of the company, prepared a final proposition, providing in general that any grievances not settled between the employees and the company should be decided by the Public Service Commission and be binding for three years, the intent of the agreement being that the company would not treat with or recognize any union, but would not discriminate between union and non-union men in its employ, and that all adjustment and arbitration should proceed only in the name of the committee of employees. The proposition of agreement in full was as follows:

TEXT OF THE AGREEMENT

"1. That the Indianapolis Traction & Terminal Company agrees that all men who went out on the strike declared Oct. 31, 1913, shall return to work with full seniority rights and without prejudice and all men who were discharged on account of becoming members of a labor organization or contemplating the same shall be reinstated without prejudice, but the company shall not be required to reinstate any employee who has taken part in acts of violence against its property. Any employee whose reinstatement is refused shall have the right to be heard by the Public Service Commission of Indiana and if its decision is in his favor shall be reinstated.

"2. That all grievances of every kind and character as to wages and conditions shall within five days from the resumption of the service by the company be presented to and taken up by the company, and if not satisfactorily adjusted within ten days thereafter shall be referred to the Public Service Commission of the State of Indiana for final decision. All members of the commission shall sit upon hearing and participate in the decision, said decision to be for a period of three years and to be binding upon all parties thereto.

"3. This tentative agreement shall be signed by a committee of the employees of the Traction & Terminal company, by Ethelbert Stewart as a representative of the United States government, Samuel M. Ralston, Governor of the State of Indiana, and the proper officials of the Traction & Terminal company.

"4. That all men shall return to work within a period of twelve hours from the time of signing this agreement under the conditions formerly obtaining in their employment, and there shall be no further interference with the operation of any cars on the lines of the Traction & Terminal company or with any property or employees of said company.

"5. Said Public Service Commission, if the matter be referred to it, shall take up and hear evidence of all parties interested on said grievance as to wages, hours and conditions, and service, and render decision concerning same within a period of thirty days from the first date of meeting, said decision in effect to relate back to the time of resumption of work.

"6. The above-mentioned adjustment and arbitration shall proceed only in the name of the committee of employees.

"It is also agreed that any employee who asks to be rein-

stated and is refused reinstatement but is returned by decision of the Public Service Commission shall receive pay from the date of first application for work."

This was signed Friday afternoon, Nov. 7, by Ethelbert Stewart, chief statistician Bureau of Labor Statistics, Department of Labor, for the United States government; Samuel M. Ralston, Governor of Indiana, and Robert I. Todd, president Indianapolis Traction & Terminal Company, and then submitted to the committee of employees of the company, who finally signed the agreement without modification about 6 o'clock Friday evening, thus ending the strike. The labor men were reluctant to permit an outside body (the Public Service Commission) to pass on their demands for higher wages and better hours, but the form of agreement was finally adopted by them.

When the operation of cars was resumed Saturday morning, Nov. 8, there were some little differences on account of a misunderstanding of the terms of the agreement, brought about entirely by the wearing of buttons by men who belonged to the union. These men at first refused to take out a car if the other member of the crew was a non-union man, and attempts were made to prevent the resumption of operation of interurban cars into the city on the grounds that the crews did not display union buttons.

Governor Ralston at once made a very positive statement in regard to the matter, saying that he would absolutely not permit any interruption of service of the interurban cars, and that the question of whether the men as individuals wished to become members of an organization was not for his consideration, but that all interference with these men must cease at once. To be assured that everything would proceed to the full letter and spirit of the agreement, he said that he would indefinitely postpone the departure of the troops quartered in the city. An effort was made by J. J. Thorpe to call a strike of the men of the various interurban companies operating into Indianapolis, but this attempt failed, as the men refused to leave their cars, and full schedules were operated on all the interurban lines entering Indianapolis.

On Monday morning, Nov. 10, Mr. Todd, as president of the Terre Haute, Indianapolis & Eastern Traction Company, and Arthur W. Brady, president of the Union Traction Company of Indiana, held a conference with Governor Ralston and informed him that they had just come from a meeting with employees of their interurban lines who had called upon them to express their satisfaction with their working agreements with the companies and their desire to be left alone by outside agitators. The matter of having some form of agreement between the interurban companies and their employees which would in the future give the trainmen the right to submit to the Public Service Commission any matters which might not be adjusted between themselves and the companies was suggested, and forms of such agreements are being prepared by the companies for execution between them and their employees.

By Tuesday evening, Nov. 11, an agreement between the Indianapolis & Cincinnati Traction Company and its employees had been completed and signed by fifty-four trainmen. The plan was worked out personally by Charles L. Henry, president of the Indianapolis & Cincinnati Traction Company, and the form of agreement was personally submitted to each employee. The agreement practically obviates any further trouble from strikes or walkouts and provides for the reinstatement by the company of all men who had been discharged since the labor troubles began. Grievances which cannot be settled by the officials of the company may be referred to the Public Service Commission for arbitration and final decision. In announcing the execution of the agreement between the Indianapolis & Cincinnati Traction Company and its employees, Mr. Henry made the following statement:

STATEMENT OF CHARLES L. HENRY

"During the last week I have been frequently quoted in the public press regarding the position of our company and its trainmen. The quotations have been more or less misleading and have frequently been conversations of other persons reporting what I should have said. I have on all occasions asserted that none of this company's men responded to the strike call when the city street car men went out, that none of them had quit work, and that the cars were being operated regularly with the regular men. I have, moreover, stated that since the strike on our line, Aug. 23 to 25, 1913, when the men went back to work in a body, there had been no complaints or disturbances of any kind among our men, and that if our men had anything to say about being dissatisfied they were ready and willing to take up the question with us and that we should be able to agree among ourselves.

"As evidence of the correctness of these statements, I am pleased to state that after a full personal conference with each of the fifty out of fifty-four of our trainmen, the other four being away on vacations, we have agreed among ourselves, without conference with or suggestions from anybody outside, to take up and settle among ourselves any questions of complaint or grievance that the trainmen or any of them may want to present, and that if upon any point we do not agree we will submit the same to the Public Service Commission for a decision. This understanding arrived at has been reduced to writing, executed by me on the part of the company, and by each one of the trainmen."

Governor Ralston expressed himself as being highly pleased with the form of agreement executed by Mr. Henry and the employees of his line and said he believed that such agreements, when arranged between the other interurban companies and their employees, would prove most satisfactory in adjusting any future disputes.

The time specified in the contract between the Indianapolis Traction & Terminal Company and its employees for presenting grievances expired at midnight Nov. 12. About noon of that day a committee of employees waited upon officials of the company and presented to them a paper which purported to be the grievances of the men, but as a matter of fact proved to be a form of agreement between the traction company and the Amalgamated Association of Street & Electric Railway Employees of America. This new contract so presented to the company was the usual form of agreement used by the Amalgamated Association, and besides containing the most prohibitive payment and working conditions for motormen and conductors, also included provisions for other men in the service of the company who had not been affected by the recent labor trouble. The contract also provided that the traction company should meet and treat with the properly accredited officers and committees of the Amalgamated Association and contained provisions for arbitration of disputes between the company and the union. The company refused to consider the document, on the ground that the new contract was not in any way a presentation of grievances within the meaning of the contract entered into Nov. 7, which was signed by the Governor, representatives of the Department of Labor, the traction company and a committee of its employees. That contract provided that all grievances should be presented to the company within five days from resumption of operation and if not settled by the company within ten days should be submitted to the Public Service Commission for final decision; also that the decision of the commission should be binding for three years and that the matters should be taken up only in the name of a committee of the employees. The traction company took the position that the new contract was an effort to avoid arbitration by the Public Service Commission and to repudiate the contract of settlement.

On the evening of Nov. 12 Robert I. Todd, president of the company, sent the following letter to the committee of employees who had signed the original agreement:

"You and each of you are hereby notified that this company does not regard the paper left at our office to-day by Albert H. Brown et al. as a presentation of grievances within the meaning of and as provided by the contract heretofore entered into on Nov. 7, 1913, and signed by you respectively, but rather as presenting a new contract. We desire to give you this immediate and prompt notice in order that you may before the expiration of the day, if you so desire, present grievances, if any exist, in accordance with the existing contract. This company does not desire to avail itself of any technical advantages, nor does it seek any advantage from the lapse of time. Therefore, so far as we are concerned, the time for presenting grievances may be considered extended five days, our time for consideration to remain ten days after the actual receipt of the grievances. We therefore desire you to consider carefully whether you have complied with the existing contract in attempting in this wise to present an entirely new contract, which would of course have the effect of abrogating the present contract. Please do not infer that we impute any bad faith in the act of presenting the paper left with us to-day. We think, after further consideration, you will also conclude that you have not, in fact, presented your grievances as agreed."

Messrs. Wyatt and Clawson, of the American Federation of Labor, in conference with Governor Ralston and with Ethelbert Stewart, of the Department of Labor, admitted that the contract drawn by J. J. Thorpe was in direct violation of the agreement signed by the employees of the company. They informed the Governor that Thorpe had written the proposed new agreement and that the men had practically nothing to do with it. Mr. Clawson stated that they were at work drafting a proposal of grievances for the men to present to the company and assured the Governor that it would not violate any of the sections of the agreement which had settled the strike. This paper, it was expected, would be handed to the company on Friday, Nov. 14, for consideration.

Robert I. Todd stated Thursday evening that 180 interurban trainmen of the Terre Haute, Indianapolis & Eastern Traction Company, being all but five men on leave of absence, had signed an agreement with the company substantially the same in form as that just signed by the trainmen of the Indianapolis & Cincinnati Traction Company. This agreement affords them the right to submit to the Public Service Commission any matters that might not be adjusted between the employees and the company. It is believed that these agreements will prevent the interference of labor agitators on the interurban lines and avoid future disturbances.

PAPER ON STREET CAR ILLUMINATION

A feature of the meeting of the Chicago Section of the Illuminating Engineering Society, Nov. 12, was a paper on the illumination of street railway cars by L. C. Porter and V. L. Staley. An abstract will be published next week.

The paper was discussed by J. R. Cravath, Chicago; A. J. Sweet, Milwaukee; H. H. Adams, Chicago Railways, and Dr. M. L. Lloyd, chairman of the section. The points brought out were that reflectors should be of a simple design so that they can easily be cleaned and that the glassware should be heavy enough to withstand railway service. It was also shown that suitable reflectors double the efficiency of lamps for car lighting. Opinion favored the center-deck arrangement of lamps unless, possibly, where longitudinal seats are used.

Mr. Adams said that in the Chicago arch-roof cars a change in the inside finish of the ceiling from pea-green to light buff had increased the illuminating efficiency of bare lamps 50 per cent. Mr. Staley, one of the authors of the paper, said that an estimate of 1200 hours per life of tungsten lamps in car lighting was conservative.

In connection with the meeting there was a small exhibit of reflectors, car-lighting fixtures and fittings. Those exhibiting were: Holophane Works, Macbeth Evans Glass Company, National X-Ray Reflector Company, Adams & Westlake Company, Safety Car Heating & Lighting Company, Appleton Electric Company and Crouse-Hinds Company.

BRAKESHOE HEARING IN NEW YORK

The hearing in regard to the use of brakes and brakeshoes on street cars, with the object of arriving at means to mitigate noises, begun before the Public Service Commission for the First District of New York on Oct. 22 and described in the ELECTRIC RAILWAY JOURNAL of Oct. 25, 1913, was continued on Nov. 5, 1913.

W. G. Gove, superintendent of equipment for the Brooklyn Rapid Transit Company, testified that his company had for the last five or six years been experimenting with devices for the reduction of street car noises. In his opinion the "squealing" is caused by the brakeshoes, wheel and rail, but about 75 per cent of the noise commonly attributed to the brakeshoe comes from the friction between the flange of the wheel and the ball of the rail. More than three years ago the Brooklyn Rapid Transit Company began experimenting with a composition-filled shoe.

In reply to questioning on the part of Commissioner Eustis, Mr. Gove stated that the composition brakeshoes are being used at present on the Prospect Park South line and the Montague Avenue line. The usual brakeshoe used by the company is a gray-iron brakeshoe, which, on account of its greater softness as compared with brakeshoes used by other roads, does not in itself cause so much "squealing." These brakeshoes on the driving wheels last about three months. The composition brakeshoe, however, while not more expensive as far as first cost is concerned, wears out more rapidly and necessitates as much of an increase as 65 per cent in maintenance charges.

The composition brakeshoe is manufactured by the American Brakeshoe & Foundry Company. One of the chief objections against the universal use of this shoe, Mr. Gove stated, is the fact that it must be bought across the counter. The Brooklyn Rapid Transit Company buys its brakeshoes on contract on a mileage basis, but the manufacturing company refuses to sell the composition shoe in this manner because it is as yet uncertain in mileage and life as well as final cost, and because the company does not as yet feel that it can guarantee the shoe on a mileage basis for universal use. Mr. Gove said that his company is desirous of adopting any efficient means of mitigating street noises, but that it is the general opinion that the composition shoe is still in an experimental stage not justifying full adoption.

Frank Hedley, vice-president and general manager of the New York Railways, said that the composition shoe being used experimentally by this company on 100 cars of the Madison Avenue line is the same as the shoe used by the Brooklyn Rapid Transit Company, and seems no more efficient than composition shoes tried out by him eighteen or twenty years ago in Chicago. In Mr. Hedley's opinion the composition brakeshoe by virtue of its lubricating the wheel flange lowers the pitch of the "squealing."

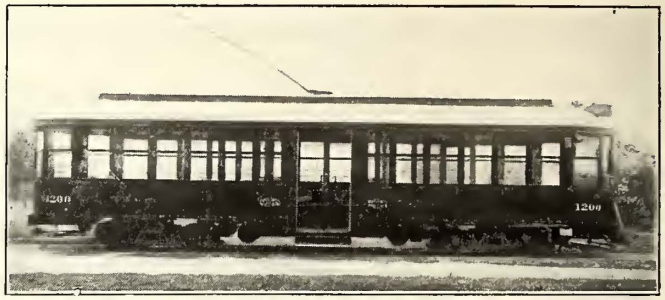
The last witness before the commission was Chief Engineer Sargent of the American Brakeshoe & Foundry Company, who testified that "squealing" is due to the sliding of the wheel on the track during braking and the rubbing of the wheel flange against the rail. Mr. Sargent's testimony agreed with that of Mr. Gove on this point that his company could not sell the composition brakeshoe on a mileage basis and that it would not as yet recommend the shoe for universal use. The experiment would be continued, however, and more improvements were hoped for. The hearing was postponed until Nov. 26 to allow the Third Avenue Railway time to complete its experiments.

ST. LOUIS CENTER-ENTRANCE MOTOR CAR

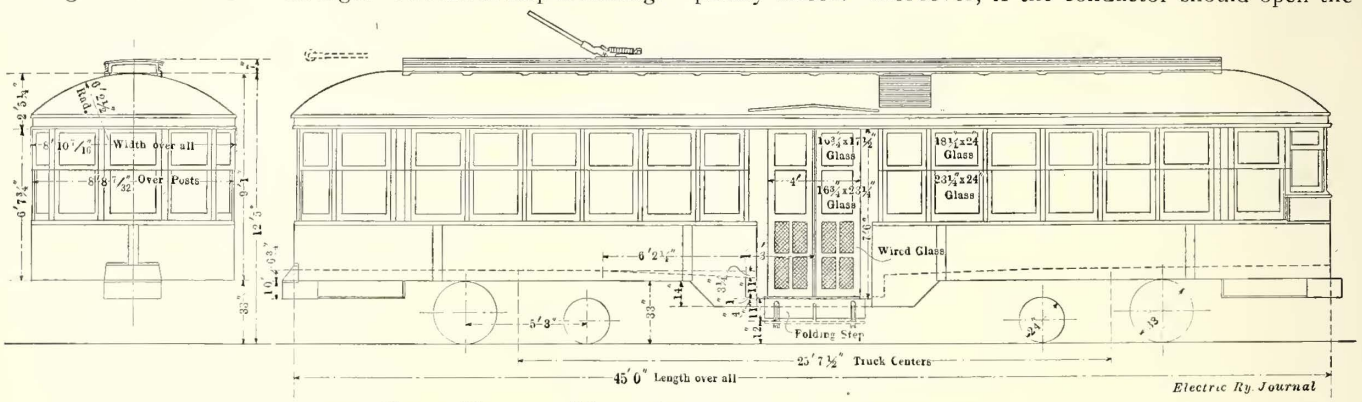
The United Railways of St. Louis has recently constructed in its shops three center-entrance motor cars which are now in operation experimentally on the Page Avenue line of that system. The car is modeled along the same general lines as that of the center-entrance trail car described on page 251 of the issue of this paper for Aug. 17 but modified so as to provide for electrical equipment. Thus maximum traction trucks are used with a 33-in. driving wheel, although on the trail car 22-in. wheels are employed. This increase necessitates a different arrangement of step and well. However, the over-all dimensions and the number of seats are the same. The side posts are 30 in. apart. The seating capacity is sixty-four, or four less than the trail car, because of the space left at the forward end of the car for the controller and brake. All of the passengers face forward except that there are short longitudinal seats for two passengers each placed at the forward end of the car.

The car is entered by the two steps, one of which is 12 in. in height and the other 11 in. high. The lower step is folding. These steps lead to a well or depressed portion in the center of the car which is 6 ft. in length but does not extend across the full width of the car, as the cross-seats opposite to the door are on the level of the floor. There is standing space in this well for eight passengers, so that this number can be loaded, the door closed and the car started before any fares are collected.

The conductor is stationed behind the fare box, which is directly opposite to the door. He has in front of him a semi-circular railing. The entrance door is opened and closed by a hand lever back of the fare box and operated by the conductor. An automatic arrangement is provided, however, so that the sliding doors operate a contactor in series with the main motor circuit. This makes it impossible for the motorman to start the car until the doors are completely closed. Moreover, if the conductor should open the doors while the car is in motion, the current is cut off from the controller. The folding step is arranged to operate in conjunction with the doors so that when the doors are closed the step is always folded.



Center-Entrance Motor Car—Side View Showing Door Open

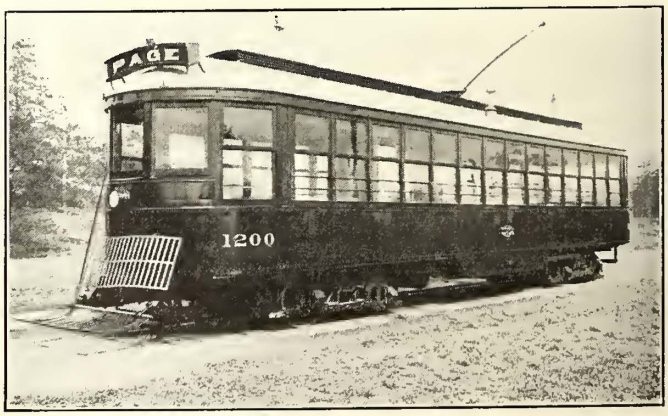


Center-Entrance Motor Car—End and Side Elevation

To enter either end of the car from the well there is a step of 11 in. There is then a slight ramp amounting to 3½ in. extending back each side of the well for a short distance, but the rest of the car floor is level. There is also a rise of 1 in. at the entrance vestibule or well so that the height of the well is 24 in. above the rail, although it is reached by two steps of only 12 in. and 11 in. respectively.

The weight of the car completely equipped is 38,700 lb., the electrical equipment consisting of two Westinghouse No. 56 motors with K-11 controllers, and the brakes being

Center-Entrance Motor Car—Interior View

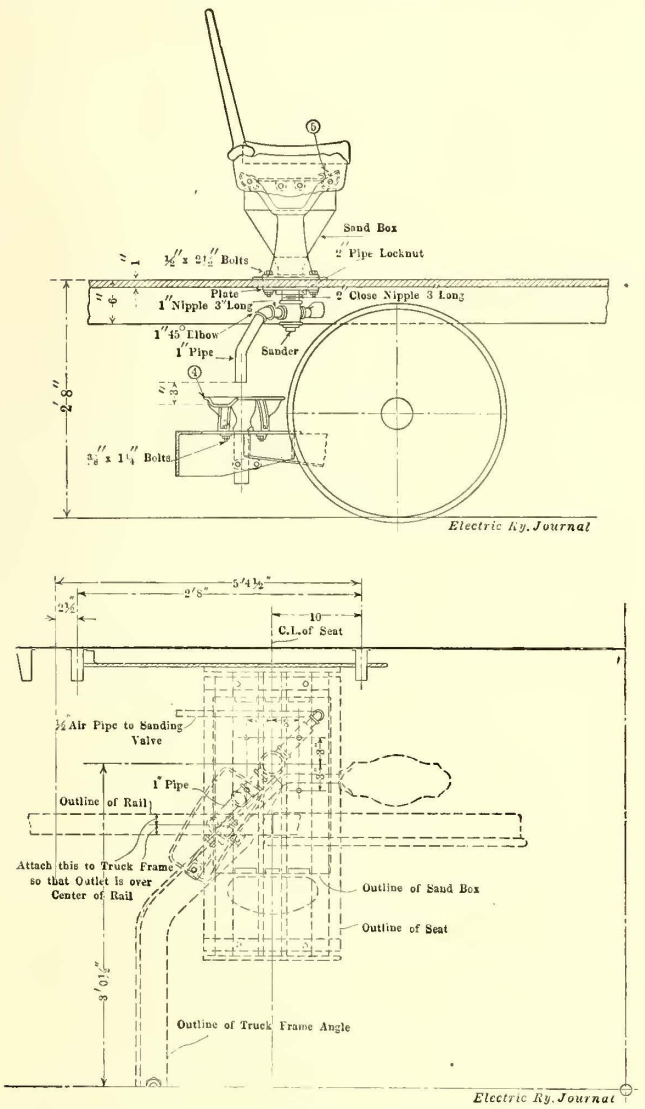


Center-Entrance Motor Car—General Exterior View

of the storage-air type. A Peter Smith hot-air heater is installed and ventilation is effected by twelve ventilators which consist of 6-in. openings in a longitudinal duct extending over the full length of the car roof.

VACUUM SANDERS FOR BROOKLYN

The Brooklyn Rapid Transit System has recently placed an order for 1128 Wyoming vacuum sanders made by the Railway & Traction Supply Company, Chicago. This requisition for sanders is probably the largest ever given at one time for a device of this character. Previous to the adoption of this sander for Brooklyn, the mechanical department of the Brooklyn Rapid Transit System had studied its operation on the surface railways of Chicago and other cities. In March, 1912, the first equipment was ordered for installation on the Brooklyn sample center-entrance car. Following its satisfactory experience with



Elevation and Plan Showing Installation of Vacuum Sander

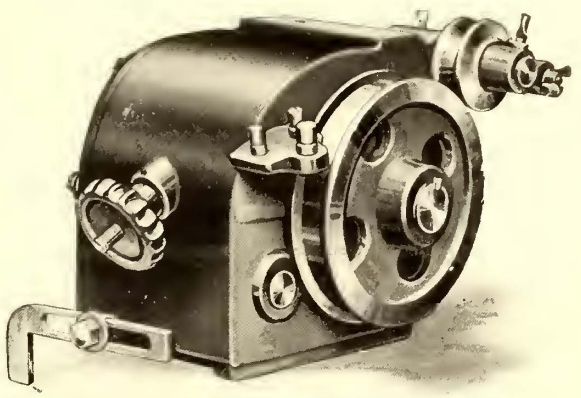
this outfit the company then ordered in the fall of 1912 200 equipments for 100 center-entrance cars, and these were installed as shown in the accompanying drawing. The last and largest order is for use on surface cars of drop-platform type which are now being equipped with air brakes.

In this device the vacuum principle is applied to insure the free delivery of sand to the rail. The sanders which have been installed in Brooklyn are of the manufacturer's standard type with two additional fittings. The first of these additions, as illustrated, is a funnel-shaped casting which is attached to the truck frame. This attachment permits the sanding of the rail on slight curves as well as on tangents, and it also protects the sand pipe against such distortion as occurs when an attempt is made to run the pipe down to the rail without an intermediate fitting of this kind.

The second addition to the sander is the instalation of a screen at the bottom of the sand box. This use of a screen followed from the experience that some motormen in attempting to break up caked sand would poke their switch irons through the box far enough to break a small adjusting plunger in the valve. The mesh of the screen is of sufficient strength to prevent trouble from this source in the future. The practice of the Brooklyn Rapid Transit System is to sand one rail only.

ARMATURE BAND-WIRE TENSION MACHINE

A new band-wire tension machine of the Peerless type has recently been placed on the market by the Electric Service Supplies Company to meet the demand for a light, portable device which can be used to advantage in connection with an ordinary lathe and which will make lathe banding as efficient as any other method of rotating the armature. It is applied to a lathe by removing the tool post and inserting a bolt which clamps the machine to the cross



Band-Wire Tension Machine

slide. The armature which is to be banded is then mounted on the lathe centers and rotated at one of the low speeds available with the lathe.

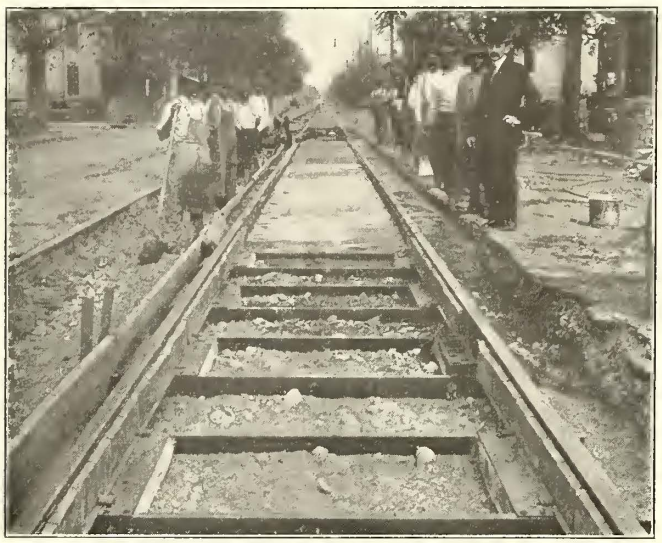
This device, with a lathe, provides a banding machine of greatest precision from the fact that the tension can be regulated from that proper for the smallest band wire to the breaking strain on the heaviest wire used. By means of this adjustment the exact tension found suitable can be established at any time. The tension remains constant and uniform throughout the banding operation without the slightest injury to the band wire or the generation of any heat.

Each pound of pressure applied at the brake drum is multiplied by means of gearing to 3 lb. at the band-wire drum, which is tapered to compensate for the tendency of the wire to crowd up against the flange. On account of this gear reduction, a comparatively small braking effect produces a very great tension on the band wire, and any change in tension can be instantly secured by regulating a hand nut directly in front of the operator.

The Peerless portable band-wire tension machine weighs 40 lb. complete, making it easy to handle and to adjust in a lathe. The gears, brake bearings, etc., are of ample strength, with large bearing surfaces, and are totally inclosed within a casing which protects them and eliminates possibility of injury to the operator. All bearings are readily lubricated from the outside by oil holes through the shaft.

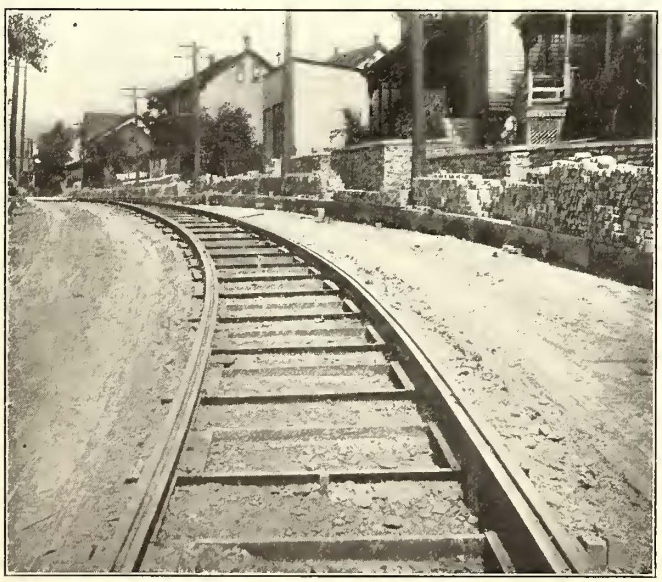
SOME INSTALLATIONS OF TWIN-TYPE STEEL TIES

In an article published in the Electric Railway Journal for Oct. 25, 1913, entitled "Cast-Weld Joints and Steel Ties in Brooklyn," an illustrated description was presented of box-girder or twin steel ties furnished by the International Steel Tie Company, Cleveland, Ohio. The installation of this tie, however, has not been confined to Brooklyn. It has been put into use on some twenty-five other properties representing all classes of traffic. The following paragraphs will describe the diverse practices followed to meet different conditions on a few of these railways:



Dayton Installation, Where Ties Were Concreted at the Yard and Tamped to Line

The Altoona & Logan Valley Electric Railway has been using this tie for three to four years and was one of the first companies to apply it on curves. An example of the latter work is shown in an accompanying halftone. The Altoona company has now made this construction standard. Its tie spacing is usually 6-ft. centers.



Installation of Twin-Type Steel Ties on a Curve on the Altoona & Logan Valley Electric Railway

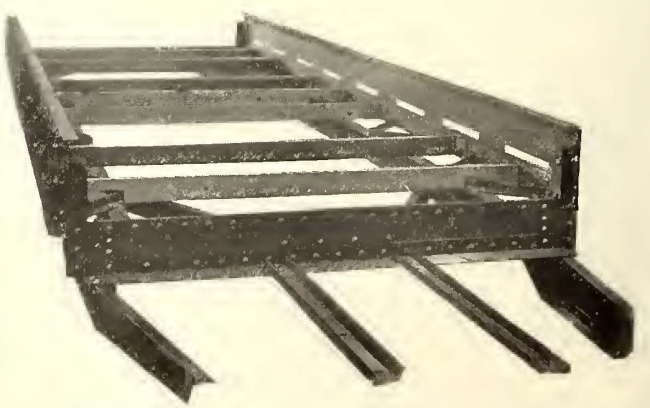
The construction adopted by the City Railway of Dayton, Ohio, differs in an important particular from that at Altoona. At Altoona the concrete is grouted in and about the tie structure and is left to set. At Dayton the concrete is cast in the ties at the yards, brought out and placed in position and tamped up to line and grade on a stone ballast foundation. Finally, as illustrated, concrete is grouted in to carry the pavement and also to distribute the load on the ballast. This method is the one recommended by the tie manufacturer, as it is believed that it will give a smooth riding track and require the least time and trouble.

The application of these ties at Lorain, Ohio, was made in April, 1913, by the Cleveland, Southwestern & Columbus Railway. The installation comprised 600 twin ties in concrete ballast for 1800 ft. of track, partly of 7-in., 70-lb. T-rail and partly of 9-in., 90-lb. girder rail. Tie rods were used on the 9-in. girder rail only. The division including this installation has a twenty-minute service with 35-ton cars. On this installation there are four steam railroad crossings.

The Cleveland Railway installed about 1 mile of these ties in 1910 in open track. The ties, which had a longitudinal bearing of 32 in., were placed 46-in. centers. The tracks, composed of rails 8 ft. to 33 ft. long, were lifted about 2 ft. from the old bed and filled in with stone ballast. It is reported that not a single clip has loosened. The Cleveland Company is also using these ties in closed track, employing them entirely for joint work. In the more recent construction on concrete foundations the ties have been placed 6-ft. centers. Still another installation is that of the Union Traction Company of Indiana, which operates cars as heavy as 50 tons on ties spaced 6-ft. centers and laid in paved streets.

PAY-AS-YOU-ENTER CARS FOR LONDON, ONTARIO

The London (Ont.) Street Railway has recently received six single-truck, single-end, pay-as-you-enter cars with 21-ft. bodies from the Preston Car & Coach Company, Preston, Ont. The cars have no bulkheads, and the floor of the car body is carried out into the front vestibule to give room for two extra passengers. Seats are also placed around the inside of the rear vestibule, which is exceptionally large and roomy, thus further adding to the seating capacity. The seats are stationary, upholstered in rattan, with pressed-steel pedestal and parts. A steel underframe, as shown in the accompanying illustration, is used. The door of the front vestibule is under the control of the motorman; the entrance and exit doors in the rear vestibule are controlled by the conductor. The outside of the car body is finished in natural cherry up to the belt rail, and above that in corn color. The interior finish of the cars is natural cherry with painted headlining. The cars are mounted on Brill 21-E trucks of 8-ft. wheelbase and 33-in. cast-iron wheels. Westinghouse 101-B-2 motors furnish the traction equipment.



Steel Underframe of Pay-As-You-Enter Car for London, Ont.

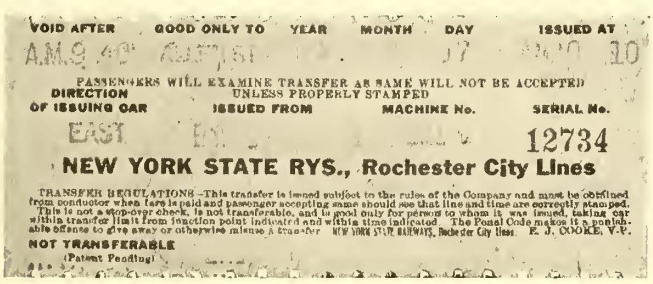
NEW INSULATING MATERIAL

The Electric Service Company, Cincinnati, Ohio, has placed on the market a new non-brittle insulating material, known as Formica, in the form of commutator rings to replace mica V-rings, bushings, taper rings, etc. It is asserted that the new material is not only better but cheaper than the usual types of mica insulation. One characteristic is the exceptionally high dielectric strength of approximately 1000 volts per mil under all atmospheric conditions. The material is non-hydroscopic and impervious to moisture so that atmospheric conditions cannot alter its insulating properties. An average commutator with V-rings and bushings of this material should have a breakdown resistance of 20,000 volts to ground. This material is said to withstand without softening 155 deg. C. (311 deg. Fahr.) continuously, or 265 deg. C. (509 deg. Fahr.) momentarily. It will not warp at any temperature and after breakage it is infusible even up to the temperature of carbonization. It is said to form freely into the sharpest angle of a V-ring, so that the edge is as strong as the rest of the ring. The ultimate tensile strength of this material is placed at 20,000 lb. per square inch and its ultimate strength under compression at 20,000 lb. per square inch in its weakest position, namely, end to end.

TRANSFER ISSUING AND RECORDING MACHINE

A marked departure in the method of issuing transfers has been made possible by the transfer issuing and recording machine which the Champion Recording Machine Company, Chicago, Ill., now has for sale. This machine prints, records and issues transfers to passengers on street cars. The printing and recording mechanism includes elements which will print time to the minute, a directional indication, date, lines to and from which transfers are issued, the number of machine, the number of each transfer, the company rules and regulations and a record of all transfers issued. Each transfer is printed and issued almost instantaneously from the machine direct to the passenger by a single pressure on a pedal. As shown in one of the accompanying illustrations, the machine resembles the ordinary fare box on prepayment cars but is somewhat smaller, consisting of a box 8 in. square and 15 in. high mounted on a pedestal. Where a fare box is employed, the transfer device is placed just beyond it, so that a passenger first deposits his fare and then moves forward to receive a transfer.

The operation of this machine requires that an indicator be set separately for each intersecting line to which it is desired to issue one or more transfers. The time indication changes automatically. A second indicator, which adjusts


VOID AFTER | GOOD ONLY TO | YEAR | MONTH | DAY | ISSUED AT

A.M. 10

PASSENGERS WILL EXAMINE TRANSFER AS SAME WILL NOT BE ACCEPTED UNLESS PROPERLY STAMPED

DIRECTION OF ISSUING CAR | ISSUED FROM | MACHINE No. | SERIAL No.

EAST 12734

NEW YORK STATE RYS., Rochester City Lines

TRANSFER REGULATIONS—This transfer is issued subject to the rules of the Company and must be obtained from conductor when fare is paid and passenger accepting same should see that line and time are correctly stamped. This is not a stop-over check, is not transferable, and is good only for person to whom it was issued, taking car within transfer limit from junction point indicated and within time indicated. The Penal Code makes it a punishable offense to give away or otherwise misuse a transfer. NEW YORK STATE RAILWAYS, Rochester City Lines. E. J. COOKE, V.-P.

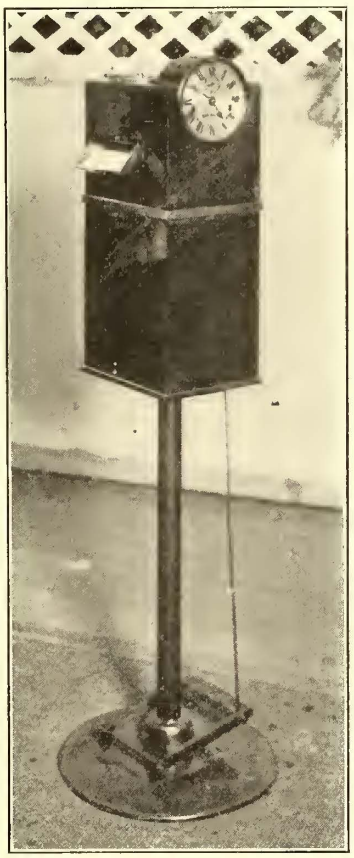
NOT TRANSFERABLE

(Patent Pending)

Reproduction of Transfer Issued by Recording Machine

the printing mechanism for the maximum time of the validity of each transfer, is set at the time the car turns back from the end of the line. A cyclometer attachment totals the transfers issued. The side of the box has a directional indicator which permits the direction of car movement to be printed on the transfer. This indicator may also be set at the end of the line or whenever the car turns back on its trip. The master movement, which controls the time element in the transfer issuing machine, is a Seth-Thomas eight-day lever clock, such as is used on high power steam locomotives. The clock requires practically no attention in actual service and is wound only when new rolls or transfers are installed in the removed case. The printing mechanism is also said to be of substantial construction.

The forms used in this machine are printed in lots of 2000 to 3000 each, depending on the quality and thickness of the paper. These are furnished in perforated rolls, and the printing includes such standard rules and information as are generally used on the ordinary transfer forms. As shown on the transfer form reproduced, spaces are left for the various data which are printed at the time each transfer is issued.



Transfer Issuing and Recording Machine

It is believed that this device will materially decrease the time of issuing transfers at crowded transfer points, reduce misuse of transfers by passengers and prevent waste of transfers through improper punching. Only the exact transfer requirements of each day are printed, and the company receives a complete record of the transfers issued. In actual service this machine has been found also to serve as a check on the arriving and departing time of crews at the end of the line because the changing of the directional lever and pressing of the pedal cause the issuance of a final transfer with a directional indication opposite to the one in which the car is about to run. This transfer is put with the canceled transfers collected on the trip just completed, and all are inserted in an opening at the base of the box. From time to time an authorized representative of the company removes the canceled transfers. A check of the uncanceled transfers in each lot representing a trip gives the car's arriving and departing time at the end of the line. One man stationed at some central point can very readily load a large number of machines with ten to thirty days' supplies without delaying traffic. Tests of this device are being made by the Detroit United Railway, the Cleveland Railway, the United Railways of St. Louis, Mo., the New York State Railways, Syracuse, N. Y., and the Public Service Railway, Newark, N. J.

Large cards were recently placed in the railroad stations of the Long Island Railroad inviting patrons to bring their complaints or suggestions to the office of General Superintendent Thornton, at the new Jamaica station, on the first and third Wednesdays of the month. Mr. Thornton, when interviewed, said: "The company wants to get in touch with its patrons, the same as a department store would. We have arranged for these 'kick' conferences to bring this about. Any patrons is urged to call us up or write or bring his suggestion or complaint direct to me."

News of Electric Railways

Chicago to Advertise for Proposals to Construct, Equip and Operate Rapid Transit Subways

The City Council of Chicago has authorized an advertisement for proposals to construct a comprehensive system of passenger subways, within the city limits, that will be operated independently of existing surface and elevated transportation lines, and that will ultimately be municipally owned, through the amortization of the construction debt out of earnings. The ordinance authorizing these invitations specifies routes that approximate 57 miles in extent, or approximately 135 miles of single track, for which the construction estimates approximate $96,000,000 for subway construction and $34,000,000 for equipment, or an estimated total of $130,000,000.

The ordinance further specifies the form in which proposals for construction and equipment are to be made, the object being to secure competitive bids on the proportion of estimated gross receipts from the operation of subways that contracting parties may consider a necessary return for their investment.

The bids are also to specify: (1) What proportion of gross receipts shall be applied to a sinking fund to amortize the construction debt. (2) Rate of division between company and city of the remaining gross receipts, after providing for operating expenses, interest on investment and sinking fund.

As the city's grant of operating privileges is limited, by statute, to twenty years, it follows that a liquidation of the construction debt will be based on the prospective subway earnings during the twenty-year operating period.

The City Council has further directed that if any proposal is deemed acceptable it shall be incorporated in a second ordinance, containing the detailed requirements of the first or preliminary ordinance, and that the second ordinance shall be submitted to a referendum vote of the citizens of Chicago in April, 1914, to give the citizens an opportunity to express their preference for one of three alternative plans for beginning the construction of passenger subways in Chicago, as follows:

1. For a comprehensive system of through-route, high-speed passenger subways, extending approximately to the city limits on three sides, to be built by private capitalists, named in the ordinance, on such terms of partnership with the city as will secure the gradual liquidation of the construction debt out of earnings, leaving the actual subways municipally owned and providing for the future transfer of operating equipment to the city, or a new lessee, at the end of a twenty-year operating period.

2. For a limited system of passenger subways, in the downtown district, to be built by the municipality itself, out of present and future accumulations in the "traction fund"; such city-owned subways to be leased to the present owners of Chicago's elevated railroad, for the latter's exclusive use, as a downtown clearing house for the elevated railroad system.

3. For a limited system of passenger subways in the downtown district, to be built by the municipality, out of the "traction fund," possibly supplemented by direct financial aid from the surface car companies, as suggested in the 1907 traction ordinances; the said downtown subways to be used exclusively for the routing of a proportion of surface car traffic.

It is expressly provided, in the first ordinance, that the second ordinance, when submitted to the voters at the April election, shall become a law only, (1) if it secures a majority of the votes cast thereon, (2) if it secures a greater number of votes than the votes cast in favor of the elevated road subway ordinance, and (3) if it secures a greater number of votes than the votes cast in favor of the surface car subway ordinance.

In the last two plans mentioned for beginning subway construction there is no necessity for competitive proposals, and the operating terms to be arranged, if either plan is chosen by the voters, are confined to the elevated railways in one case, and to the surface railways in the other case.

This leaves the first-mentioned alternative plan—that of a comprehensive citiy-wide system of subways—as the only plan in which competitive proposals are invited.

Further, such competitive proposals must be received by the Chicago City Council in ample time to permit the canvassing of the same and the drafting of a second ordinance for submission to the voters in April, 1914.

The Boston Arbitration Hearings

Before the arbitration board sitting in the Boston (Mass.) Elevated Railway labor investigation during the last few days, Charles H. Hile, chief of maintenance, set forth the differences between street railway and industrial shop practice and conditions and reviewed wages in Boston as compared with other companies in Massachusetts. Exclusive of officials,, foremen, clerks, stenographers and others engaged in occupations not classed as trades there are 2570 employees included in the bureau of maintenance. Of these 21.26, or 83 per cent, are engaged in eleven trades, and the remaining 444 represent other trades, in each of which the company employs a small number of men. In the bureau are 420 laborers and others, 392 mechanics and helpers, 316 trackmen, 269 car cleaners, 183 pitmen, 176 woodworkers and helpers, 113 painters and helpers, 73 carpenters and helpers, 66 blacksmiths and helpers, 64 pavers and 54 wiremen and helpers.

Mr. Hile presented tables comparing the wages paid by the Boston Elevated Railway with those of employees in the same lines of trade on the New York, New Haven & Hartford Railroad, the Boston & Maine Railroad, the Boston & Albany Railroad, and the Bay State, Worcester Consolidated, Boston & Worcester and Middlesex & Boston street railways, confining himself, in accordance with the ruling of the board, to conditions in Massachusetts. The basis of comparison was the average hourly rate of wages. The table presented showed that the Boston Elevated Railway paid its carpenters, pavers and trackmen higher average hourly wages than any of the other companies for which figures were given; that the Boston company paid next to the highest average hourly wages to laborers, pitmen and wiremen; that two companies paid higher average hourly wages to car cleaners, mechanics, painters and woodworkers, and that three companies paid higher average hourly wages to blacksmiths. The average hourly wages paid by the company in each of the eleven principal trades in the bureau of maintenance and the numbers of other companies for which corresponding figures were available and admissible for comparison that were higher or lower are shown in the following table:

Trade	Boston Rate	Others Higher	Others Lower
Blacksmiths	31.1	3	5
Car cleaners, surface	19.3	..	..
Car cleaners, elevated	20.1	2	5
Carpenters	31.8	0	1
Laborers	20.1	1	5
Painters	28.5	2	5
Mechanics	28.5	2	4
Pavers	37.5	0	2
Pitmen	26.5	1	4
Trackmen	22.8	0	3
Wiremen	30.4	1	4
Woodworkers	28.5	2	6
		14	44

J. Henry Neal, general auditor, testified that for the fiscal year ended June 20, 1913, the company had a deficit of $496,377 after paying fixed charges, cost of operation and dividends. During the year the company carried 326,352,863 revenue passengers and about 272,000,000 free transfer passengers. Provided the company is able to maintain dividends at an average rate of 6 per cent, it will be paying a return of about 4.94 per cent on the amount received for both stock and bonds. The stock of the Boston Elevated and West End companies is held mainly by small stockholders. Further testimony concerning the obligations of the company was given by Mr. Neal as outlined in the opening statement abstracted in the Electric Railway Journal of Nov. 1, page 993. If dividends are paid on the stock at the present rate of 6 per cent the company will have to meet an increase in fixed charges and dividend allowances of $315,764 in the present year. An interesting table presented

by Mr. Neal gave the weekly wages paid to all regular and regular extra motormen and conductors listed Aug. 1, 1913, showing the range of compensation and number of each class receiving it.

ANALYSIS OF WEEKLY PAY, REGULAR AND REGULAR EXTRA MOTORMEN AND CONDUCTORS

Range in Pay	Conductors	Motormen
$8 but under $9	1	0
9 10	0	2
10 11	4	1
11 12	2	1
12 13	13	5
13 14	25	5
14 15	38	23
15 16	73	58
16 17	120	99
17 18	186	194
18 19	20	71
19 20	71	146
20 21	29	33
21 22	13	12
22 23	3	7
23 24	1	2
24 25	1	4
25 26	0	2
26 27	0	1
	729	872

The company now pays one and one-ninth times the rate per hour that it paid prior to Jan. 1, 1913.

In response to questions by the company's counsel, Mr. Neal stated that total wages paid in the maintenance of way on surface lines had increased 7.3 per cent in the past five years; 25 per cent in the elevated road department; 14.67 per cent in the armature shop; 17.7 per cent in the Bartlett Street shop; 11.69 per cent in the Albany Street machine shop; 14.4 per cent in the Sullivan Square and Guild Street shops; 16.7 per cent for carhouse pitmen; 17.1 per cent for car cleaners; 3.78 per cent for the Albany Street yard crew; 8.6 per cent in the department of wires and conduits; 18.3 per cent in emergency crew service; 14.79 per cent in the building department, and 7.6 per cent in the stores department.

Mr. Snow then questioned the witness as to the cost of granting the requests of the employees' organization for increases in wages at the Bartlett Street shops, the machine shops and for the general maintenance crews. Mr. Neal said that 310 men were affected at the Bartlett Street shops, and that the proposed increase would cost $56,001 annually; that to increase the wages of 176 machine shop employees would cost on the proposed basis $44,850 per year, and the proposed increase of emergency crew wages applying to 53 employees would total $9,876, making a total of $110,728. This does not represent the total cost of the proposed wage increase, as the employees' organization includes in its memorandum only 79.7 per cent of the total payroll, or about 72.6 per cent of the number which the company would have in service under normal conditions.

Mr. Neal stated on cross-examination that he estimated the loss of revenue to the company during the strike of 1912 at $250,000, and added that payments were also made to strike-breaking organizations, bonuses to men who remained loyal to the company, meal and lodging expenses and other items which possibly totaled $1,000,000. Heavy losses were sustained from uncollected and improperly retained fares. Free passes are issued to lessees of bootblack stands, news stands and vending machines on the rapid transit lines, but the company issues practically no passes permitting persons to ride free of charge on its system as a whole. Police officers and firemen in uniform are carried free, as are uniformed employees. Letter carriers ride on 5-cent tickets purchased for their use by the government. The company derives a revenue of $37,097 for the carriage of mails. Mr. Neal said that careful analyses of this service showed that its return was entirely inadequate to the company. Efforts are being made at Washington to secure about $20,000 per year more for this service. The company sets aside 3.5 per cent of its receipts to meet the cost of legal services and tracing in case of accidents.

Notwithstanding that the Leicester (Eng.) Town Council obtained the necessary parliamentary powers to run motor omnibuses over certain routes, it has decided to extend its tramway system over these same routes. The committee reports that the P. A. Y. E. system is a satisfactory one, and it has been decided to provide ten additional cars on the P. A. Y. E. principle.

Cleveland Hard Hit by Lake Region Storm

An extremely severe snowstorm struck Cleveland on the night of Nov. 9 and as a result both street car and railroad traffic was almost completely tied up on Monday, Nov. 10. The storm began with rain. This was followed with a heavy fall of snow accompanied by a high wind which caused huge drifts to accumulate in many places.

The tracks of the Cleveland Railway were coated with ice and slush in addition to the snow, and electric light, telephone and telegraph poles and wires were blown across the railway lines in many places. The sections along St. Clair Avenue, Superior Avenue, 105th Street and the Collinwood addition on the East Side suffered most, although the damage also was great on Broadway, Cedar and Woodland Avenues and East Fifty-fifth Street. On the West Side Detroit Avenue suffered most, but the Lorain Avenue, West Twenty-fifth Street and Clifton boulevard lines were tied up also. The company succeeded in operating a few cars on Euclid Avenue on the morning of Nov. 10 and later in the day Cedar Avenue was opened for a portion of the distance. A heavy snow continued to fall through the day and the united efforts of the sweepers were required to keep these lines open.

About 1500 men were employed to shovel snow from the other tracks and aid in getting the lines into operation, but on Nov. 11 only five or six lines had been opened. On the afternoon of Nov. 12 the following report in regard to service was made: Intermittent service on Euclid, Wade Park, Superior, Scovill, Woodland, Kinsman, West Fourteenth, Central, West Twenty-fifth, Lorain and East Fifty-fifth between Broadway and the lake; East 105th, no service for two days; Scranton, service late Wednesday; Broadway, line open from Corlett to Public Square; Clifton, line to be open late Wednesday; Detroit, uncertain schedule of cars being operated in section between Public Square and Rocky River; Shaker Heights, South Brooklyn and Corlett, service late Wednesday evening; Fulton, line to be opened Wednesday afternoon; Payne, line open east from Fifty-fifth Street; St. Clair, cars operating between Public Square and East Fifty-fifth Street and entire line to be open by Wednesday night.

Operation on all interurban lines reaching Cleveland was stopped Sunday night. The Lake Shore Electric Railway resumed service on Wednesday morning and the Cleveland, Southwestern & Columbus Railway arranged to resume service on Wednesday afternoon. All the other lines expected to have cars in operation late Wednesday evening.

The engineer in the Street Railway Commissioner's office estimated the damage to the Cleveland Railway at between $100,000 and $125,000.

Additional Rapid Transit Bids in New York

The Public Service Commission for the First District of New York opened bids on Nov. 10 for seven additional portions of the new subways. The bids were for the construction of Section No. 3 of Routes Nos. 4 and 38, the Seventh Avenue Subway in Manhattan. This will be a branch of the existing subway from Times Square south through Seventh Avenue and other streets to the Battery and Brooklyn, and will be operated by the Interborough Rapid Transit Company as part of the existing subway. Section No. 3 covers that portion of the line in the Varick Street and Seventh Avenue extension between Beach and Commerce Streets. These three lowest bids were Degnon Contracting Company at $2,185,063, Rodgers & Hagerty at $2,563,787 and the Oscar Daniels Company at $2,576,476.

Bids for Section No. 2, immediately south of this section, were opened on Oct. 1, but the commission has not yet awarded the contract. Bids for Section No. 5, which covers that portion of the line in Seventh Avenue between Sixteenth and Thirtieth Streets, were opened on Nov. 12. The three lowest bidders for this work were Canavan Brothers Company at $2,401,000, Rapid Transit Subway Construction Company at $2,531,000 and MacArthur Brothers Company at $2,670,000.

On Nov. 18 bids will be opened for the construction of the Steinway tunnel extension from its present terminus in Queens to the Queensboro Bridge. On Nov. 21 bids will be opened for the construction of the proposed elevated rail-

road, to be operated by the New York Municipal Railway Corporation, in New Utrecht Avenue. This will be a branch of the Fourth Avenue subway in Brooklyn. On Nov. 26 bids will be opened for the construction of the northern half of the proposed elevated railroad in White Plains Road, the Bronx. This line will be an extension of the existing subway from Bronx Park north through White Plains Road to 241st Street, near the northern city line. The section on which bids are being asked extends from Gun Hill Road to 241st Street. On Nov. 28 the commission will open bids for the construction of the southern half of the proposed elevated railroad in Jerome Avenue, the Bronx. This line will be a branch of the Lexington Avenue subway, now under construction, and also will be used as an extension of the present West Side elevated railroad system, now terminating at 155th Street and Eighth Avenue. The section on which bids are being asked lies between 157th Street on the south and Burke Avenue on the north. On Dec. 1 bids will be opened for the construction of the middle section of the Southern Boulevard and Pelham Bay branch of the Lexington Avenue subway. The section on which bids are being asked lies in Southern Boulevard and Whitlock Avenue between 147th Street and Bancroft Street, and the construction will be almost entirely underground work. The first section of this subway, running under 138th Street and Southern Boulevard to 147th Street, is already under construction.

The Public Service Commission for the First District has approved the form of contract for the construction of Section No. 6 of Routes Nos. 4 and 38, the Seventh Avenue subway in Manhattan. Section No. 6 covers that portion of the subway under Seventh Avenue between Thirtieth and Forty-second Streets. As this line is being built with the money contributed by the Interborough Rapid Transit Company, the form of contract was ordered sent to that company for approval, in accordance with the dual system agreements. The company has ten days within which to return the same with its criticisms and suggestions.

Financing of Electric Service Properties

Samuel Insull, president of the Commonwealth Edison Company and the Middle West Utilities Company, Chicago, addressed the convention of the Investment Bankers' Association of America in that city on Oct. 30. His subject was "Electrical Securities."

Mr. Insull made the point that there are two classes of engineering influencing the electric-service industry. One is the mechanical and electrical engineering—that is, the engineering construction—and the other is first-class selling engineering. He spoke of his work of the last ten years in relation to the wholesaling of energy in very large quantities, and he described the effort that has been made and is still being made to fill up the valleys in the load curve. The problem is to keep the investment working for as many hours of the day and as many days of the week as is possible. In the production of electrical energy the greatest item of expense is the cost of money. First-class selling engineering makes it possible to get useful work from the dollar of investment for the longest possible time. Mr. Insull said he thought that if he had to choose between first-class construction engineering and first-class selling engineering he would select the latter, as it would give him the use of more money on the dollar invested with which to make up for possible mistakes made in constructing engineering. The item of paramount importance in the financial aspects of the electric service industry is not the replacement value of the central station or the distribution system, but it is the assurance that the selling organization of the company under consideration is of the highest possible order.

Mr. Insull gave statistics showing that in 1898, when the Commonwealth Edison Company had something over 5000 customers, the investment per customer was $1,579. In 1912 the number of customers was nearly 180,000 and the investment per customer had dropped to $417. In 1898 the annual gross income per customer was $210, and in 1912 it had dropped to $87. Elucidating these figures, Mr. Insull said, "We have produced a greater saturation of the dollar with energy." The income in 1898 was 13.5 per cent of investment. In 1912 it was 21 per cent of the investment.

Mr. Insull then considered the diversity factor to show the advantages of concentration of production in supplying a large area with different demands, as, for instance, the State of Illinois. If the lighting business, local and interurban railways, ice-making plants, coal-mining, water-works pumping, drainage pumping and so on were supplied from the same source of energy, striking economies could be effected.

In relation to holding companies, Mr. Insull said that the great danger here is the multiplication of securities and the creation of so-called prior-lien securities of the holding company, based upon the junior securities of the operating company or companies. If the deed of trust underlying the collateral trust securities is rigid enough to protect the purchaser against the creation of a large floating debt by the operating company, there is no reason why the stocks of operating companies should not be put up as security for collateral trust bonds of holding companies. The mere creation of paper securities, however, does not add anything to the actual cash invested in the companies.

Mr. Insull quoted from his presidential address of 1898 to the National Electric Light Association, in which he advocated public control as the proper safeguard of the interests of consumers, taxpayers and investors. Generally speaking, the creation of state public utility commissions has been for the good of the industry and for the good of the securities based on the industry, as well as the good of the people in the communities served. In the principal cases where regulation has seemed to be unfriendly it will no doubt often be found that the men in control of the property have not had a proper appreciation of the underlying principles governing the business. If an administrative board is made up of honest men, it will give the utilities a fair return on the money invested provided that money has been judiciously spent and the business judiciously conducted.

Mr. Mellen Discusses New England Trolleys

In an interview published in the Boston *Sunday Post* of Nov. 9, 1913, Charles S. Mellen, former president of the New York, New Haven & Hartford Railroad, declared himself in part as follows:

"The New Haven, long before I took charge, had been in the electric railway business because the electrical lines are natural feeders of traffic to the main road, and in acquiring additional lines I stepped on the toes of the people who control the Boston Elevated Railway, the Massachusetts Electric Companies and the Boston & Worcester Street Railway. They raised the cry of monopoly against the New Haven, although at the same time they were trying to monopolize the field for themselves. The New Haven policy met with no opposition in Rhode Island or in Connecticut, or in Massachusetts, for that matter, outside of Boston and vicinity.

"The electric railways owned by the New Haven have been, with one exception, as profitable as the Boston Elevated Railway. If the electric railways are held they will prove big money makers for the New Haven. The fact is that the electric railway interests of New England and even those outside of New England are anxious to get the electric railway lines for themselves. Even now some of the trolley lines are being investigated by the Boston interests for the purpose of placing a valuation upon them. When their value has been thus determined, the same interests will try to take them over at their own valuation. They are anxious to remove this source of weakness from the New Haven system. When they have acquired the electric railways they will push through their Boston to Providence electric road scheme and be direct competitors of the New Haven. This is the way they are planning to help the poor New Haven stockholder.

"The New York, Westchester & Boston Railway was purchased prior to the panic of 1907. It is generally known that I was not in favor of this purchase. If I had had that money without the Westchester I could have four-tracked the road from Boston to Providence, could have taken out curvature and revised alignment which would have saved 5 miles between Providence and New London, and I could have electrified the entire New Haven road between New York and Boston.

"The stockholders' protective committee was formed in Boston in the interest of the fiscal agents and dominated by them. It was simply a blind behind which my work was supposed to be investigated and condemned. As a matter of fact, I was condemned in advance. While I was the operating head, the house of Morgan absolutely dominated the New Haven policies. J. P. Morgan is dead; but control is just as absolutely with that house to-day, and the second generation is working hand in glove with the Boston bankers. The stockholders' committee, with all its imposing names, is nothing more than a marionette wiggled from the back by the Boston Machiavelli."

According to Mr. Mellen no corporation official is worth a salary of more than $25,000 per year. He himself, he states, would have worked as hard for the New York, New Haven & Hartford Railroad for $25,000 a year as he did for $60,000 or $75,000.

Mr. Mellen sees government ownership ahead. He said: "The railroads will all go under government ownership. It is coming quickly. The regulation by the government during the last ten years has tended to lower the value of railroad stocks as investments. There will not be any great opposition to government ownership when the time arrives, because private capital will find the field unprofitable."

Howard Elliott, chairman of the board of directors of the New York, New Haven & Hartford, made the following reply to Mr. Mellen:

"As to the electric railways, the Boston & Maine Railroad, the steamships and any other outside purchases, I desire to state again that all of these matters are under the most careful investigation by committees of the directors and by technical experts who will give to the directors information independent of the officers.

"I have no opinion to express as to the wisdom or the unwisdom of any purchase or policy in the past. All of these matters must be passed upon by the board, which will give full consideration to the special reports to be made, to the report of the Interstate Commerce Commission, to the views of the Department of Justice, and to the interests of the stockholders and the bondholders.

"It may be of interest to state here that of the board as it is now constituted a majority have been elected since the last electric railway purchases and since the last steamer line purchases except in the case of the New Bedford and Martha's Vineyard line."

William A. Gaston, president of the National Shawmut Bank and identified with Morgan interests in Boston, took exception to Mr. Mellen's statement about Boston bankers, saying he believed they had sustained instead of hindered Mr. Mellen in his work. Mr. Gaston said:

"I am sure that the trolley interests of Boston had no desire to monopolize the field. They have all the trolleys they want."

Charles A. Stone, of Stone & Webster, stated that the interests connected with them were in no way responsible for the conditions which exist on the New York, New Haven & Hartford Railroad.

A member of the firm of J. P. Morgan & Company denied emphatically that a contest between the New York and Boston bankers over the control of the New York, New Haven & Hartford Railroad had in any way contributed to the difficulties of the railroad, as was alleged in the statement made by Mr. Mellen in the interview with him which appeared in the *Post*.

Suit Regarding Couplers at Buffalo

Whether or not electric railways doing an interstate business or operating over an interstate line shall be forced to equip their cars with automatic couplers will be decided within the next two weeks by Judge John R. Hazel of the United States court for the western district of New York, sitting in Buffalo. The case is that of the government against the International Railway charging nine violations of Section 2 of the safety appliance act of the interstate commerce laws. It is alleged in the complaint filed with the court that the International Railway operated nine passenger cars from Lockport to North Tonawanda on Feb. 10, 1913, equipped with link and pin couplers, instead of automatic couplers as required under the federal statutes. Nine violations are charged in the test case and the government seeks to recover a penalty of $900 from the company.

In its answer filed with the court, counsel for the International Railway asserted the cars in question were operated wholly within one state and asked that the complaint be withdrawn with costs for the defendant. The motion to this effect was denied by the court.

The United States district attorney will contend that the cars were being operated over the Erie Railway between Lockport and North Tonawanda and that the Erie Railway is an interstate railroad. The federal authorities also contend that the International Railway comes under the jurisdiction of the government in such matters because it has a line running into Canada at Niagara Falls, Ont.

Making Good the Deficit in Cleveland

Discussing the street railway situation as it exists at present, the Cleveland *Leader* in its issue of Nov. 7 stated that a 1 cent charge for transfers would have to be put into effect on March 1, 1914, by the Cleveland Railway to meet a deficit of about $1,560,000 which must be made good by the end of the ordinance year to comply with agreements entered into between the city and the company. The paper says that the deficits arise from $360,000 that must be charged off for worn-out cars, $800,000 that the arbitrators said should be charged off immediately, and an indicated deficit in the maintenance fund that railway men say will amount to $400,000. J. J. Stanley, president of the company, is said to be willing to allow the $800,000 to stand until the end of the ordinance year. It is estimated that the charge of 1 cent each for transfers will yield $700,000 in one year, based on past experience. It may, however, also be necessary to increase the allowance for maintenance and operation to make up the deficits. The *Leader* asserts that the company and the city will probably be able to reach an agreement without the necessity of resorting to arbitration if new questions arise.

Decision in Chicago Car-Heating Case.—The Appellate Court at Chicago has sustained the decision of the municipal court to the effect that the elevated railroads of Chicago are organized under the general railroads act of the State and that the city ordinance in regard to the heating of passenger cars applies only to street railways.

Final Argument in Toronto Deviation Case.—The argument was concluded in the Privy Council, London, Eng., on Oct. 28 in the case of the Toronto & York Radial Railway versus the city of Toronto concerning the right to deviate the railway. The Privy Council, after hearing the appeal of the railway, intimated that it would be unnecessary for the city to present its case, thus indicating its intention of confirming the finding in favor of the city.

Portland, Eugene & Eastern Operation.—Announcement has been made by the Southern Pacific Company that pending the complete electrification of the Portland, Eugene & Eastern Railway the parent company will handle all operating and traffic matters connected with the proposed electric line. Steam service will be operated on the new lines until electrification is completed, when traffic and operation control will be resumed by the Portland, Eugene & Eastern Railway.

Chicago Unification Ordiance Passed.—At the meeting of the City Council of Chicago, Ill., on the evening of Nov. 13, the ordinance providing for the unification of the systems of the Chicago Railways and the Chicago City Railway was passed with unimportant amendments. The ordinance was before the Council previously on the evening of Nov 10, when action was postponed on motion of Alderman Cullerton, who stood out for an expression of opinion from the Corporation Counsel in regard to the status of the employees of the company under the proposed re-arrangement.

Work Begun on Pennsylvania Electrification at Philadelphia.—Work has been begun at St. Davids on the electrification of the main line of the Pennsylvania Railroad between Philadelphia and Paoli. The announcement was made by President Rea last March that the company would electrify its line from Philadelphia to Paoli and

that the work would be completed in 1914. Other steps in the general plan of electrification improvements are the enlargement of Broad Street station, the Girard Avenue bridge over the Schuylkill and track improvements at North Philadelphia and on the company's Chestnut Hill branch.

Mayor Jost Recommends Approval of Franchise Ordinance.—Mayor Jost of Kansas City, Mo., has recommended that the franchise ordinance as it now stands be accepted by the City Council, which is now considering the ordinance granting a franchise to the Metropolitan Street Railway. The Council committee will hold daily sessions after it has fully digested the ordinance and its provisions. At that time any Kansas City resident who desires to bring some new feature to the attention of the committee will gain a hearing. W. F. Brown has been elected chairman of the special committee from the two boards of the Council.

Municipal Ownership Proposals Defeated.—On Nov. 4 the voters of Grand Junction, Col., rejected three separate proposals for municipalizing the local public utilities. One proposition was for the purchase or construction of an electric plant, another was for the purchase or construction of a gas plant, and a third was for the purchase of all the properties of the Grand Junction & Grand River Valley Railway Company, including gas, electric and railway departments. The largest vote against municipal ownership was on the question involving the municipalization of the property of the Grand Junction & Grand River Valley Railway Company.

New York's Study of London and Paris Bus Service.—Under date of Nov. 5, the Board of Estimate and Apportionment, City of New York, presented to Mayor Kline through Chief Engineer Nichols a report on bus operation in London and Paris as made by John A. McCollum, the special representative of the board. The report reviews at length the conditions under which motor buses are operated in the cites named, compares the burdens borne by buses and by electric railways, and points out the desirable limitations of bus service for a city like New York. A more extended review of this report will appear in a later issue of the Electric Railway Journal.

Extension to Michigan Central Depot in Detroit.—The city administration of Detroit issued an ultimatum recently to the effect that the Detroit United Railway must build extensions from both Michigan Avenue and Fourteenth Street and build them at the same time, but fixed the fare for the Fourteenth Street extension at eight tickets for 25 cents or on the basis of the old 3-cent fare lines. The company was to be permitted on the Michigan Avenue extension to collect fares at the seven-for-a-quarter rate. The company refused to meet these conditions and the Mayor has agreed that the company may build the Michigan Avenue extension at this time under the contract made last August and to charge the same fare as on the other lines. The extension is intended to provide accommodations to the new Michigan Central depot.

Washington-Virginia Railway Resists Fender and Wheel-Guard Order.—The Washington-Virginia Railway, Washington, D. C., has asked for an injunction against the Public Utilities Commission to prevent the carrying into effect of an order that it equip its cars with automatic projecting pick-up fenders and automatic wheel guards. The railway company questions the authority of the commission to pass the order on the ground that it is identical with one which the Interstate Commerce Commission refused to require to be enforced. Owing to its interurban traffic, where is maintained a much greater speed than allowed in the District, the company claims it would be dangerous to equip its cars with the required fenders, as they would likely become displaced. Such displacement would possibly result in the derailment of the cars, it is suggested, with consequent loss of life and property.

Way Cleared for Construction of Twin Peaks Tunnel, San Francisco.—The resolution levying assessment in the matter of the construction and completion of a tunnel with approaches and appurtenances thereto and of the acquisition of lands and easements therefor under the Twin Peaks Ridge has been passed by the Supervisors of San Francisco. This action clears the way for commencing construction work on the $4,000,000 subway which is to give rapid transportation facilities to the section west of Twin Peaks. On the recommendation of the Public Utilities Committee the Supervisors adopted a resolution declaring in favor of the construction of a branch of the Geary Street Municipal Railroad along Masonic Avenue from Geary to Turk Street to connect with the proposed new baseball park.

Philadelphia Loan Bill Passed.—At the election in Philadelphia on Nov. 4 the voters approved the proposed $8,600,000 loan by the city. This loan, with other things, commits the city to the construction of a Broad Street subway, with elevated branches, and the other rapid transit improvements projected by Transit Director Taylor. Mr. Taylor is quoted as follows: "The passage of the loan bill means much to the city. It marks another important step toward securing improved transit facilities. With real rapid transit, via routes properly located, the physical and commercial expansion of the city will be accelerated along proper lines." T. E. Mitten, chairman of the executive committee of the Philadelphia Rapid Transit Company, is expected to return from Europe about Dec. 1. He will probably report soon thereafter on the question of the company operating the proposed Broad Street line under lease from the city.

Electrical Day in Dallas.—In connection with the electrical parade which was held in Dallas, Tex., on the night of Oct. 31 the Dallas (Tex.) Consolidated Electric Street Railway displayed a 10-ft. body box car, a relic of the nineties, drawn by a pair of mules and driven by a former employee of the company who drove the same car in the early days. This old car was received by the spectators with much applause, particularly by those old-timers who recalled the days when the car was one of several that operated on what is now the Ervay line. The car was followed by two modern street cars operating in a train with multiple-unit control. The ornamental lighting system was discontinued along the line of march during the progress of the parade so the temporary lighting effects might appear to the best advantage. The parade proved very successful, and it is probable that an "electrical day" will hereafter become a permanent feature in connection with the annual state fair.

Plans for Railroads at Manhattan Approach to Queensboro Bridge.—Arthur J. O'Keefe, bridge commissioner of New York, has completed plans for the Manhattan approach of the Queensboro Bridge, which is built over the East River between Fifty-ninth Street, Manhattan, and Long Island City. They provide for surface, underground and overhead transit lines and they occupy four blocks between Fifty-ninth and Sixtieth Streets, Second and Third Avenues. This area is assessed at $933,000 for the land and $1,217,000 for buildings. The approach to the bridge will begin at Third Avenue, thus connecting with the elevated at that point. The Lexington Avenue subway will pass it a block away. The surface car lines crossing the bridge from Queens and Brooklyn will enter a sub-surface station which will take the place of the present station. The subway trains from Long Island crossing the bridge will run westward to Seventh Avenue, south to Forty-second Street, down Broadway to Vesey Street, and thence to a new tunnel under the East River from Whitehall Street in Manhattan to Montague Street in Brooklyn.

Report in Regard to Interurban Entrance to New Orleans.—Consulting Engineer Coleman, who was employed by Mayor Behrman and the Commission Council of New Orleans, La., to investigate and report on the routes under consideration for the entrance of the interurban road into its proposed terminus in University Place, has reported to the Mayor and the commissioners. Mr. Coleman's conclusions are that the most dangerous and unacceptable route of the eight which were submitted to him is what is known as the "straight route," extending from Gasquet Street straight across Elk Place and across South Rampart Street to the terminal. He commends as the most safe and feasible route that which was suggested by Commissioner of Public Property E. E. Lafaye, as a modification of the Carroll plan, by cutting out the portion running through University Place to Common Street and on Common Street to South Rampart Street. Mayor Behr-

man, City Attorney I. D. Moore and District Attorney Marrero have been named by the Jefferson Police Jury as a committee to look into the interurban railroad project with the view of reaching some amicable route and settling other details.

Leased Companies File Suit to Recover Excise Tax.—Four railway companies whose properties are operated upon a rental basis by the Ohio Electric Railway have brought suit against Andrew C. Gilligan, collector of internal revenue, in the Common Pleas Court at Cincinnati, Ohio, to recover the special excise tax paid to the federal government for 1912 and 1913. The claim is made that the Ohio Electric Railway has paid the excise tax on its net income and that this covers the net income of the four roads it operates on a rental basis. The net income of these companies goes to the Ohio Electric Railway, they claim, and the only return they receive is the rental paid by that company. The amounts claimed are as follows: Indiana, Columbus & Eastern, $1,201.36 for 1912 on a net income of $120,136 and $1,387.50 on a net income of $138,750 for 1913; the Fort Wayne, Van Wert & Lima Traction Company, $450 for 1912 and $450 for 1913 on a net income of $45,000 for each year; the Dayton & Western Traction Company, $823.50 for 1912 and $823.50 for 1913 on net incomes of $82,350 for each year, and the Columbus, Newark & Zanesville Electric Railway, $339.88 for 1912 on a net income of $33,988 and $400.77 on a net income of $40,077 for 1913.

Hearing in Regard to Abandonment of Road.—Efforts are being made by Batavia (N. Y.) citizens to buy the Buffalo & Williamsville Electric Railway, which has petitioned the Public Service Commission of the Second District of New York for permission to abandon its Batavia line on the ground that it is a losing financial proposition. A hearing was held in Batavia on Nov. 10 on the company's petition to abandon the road. Several individuals asserted they were ready to join a company to buy the railway, but an agreement could not be reached with the company regarding the value of the line. Loran L. Lewis, Jr., and Godfrey Morgan, of Buffalo, officers and part owners of the line, at first estimated that they should receive $14,000 for the road. An adjournment was taken in order to give the railway officials and those interested in the purchase an opportunity to agree on terms. The railway officials offered to refer the matter of fixing the value of the road to Judge Haight, of Buffalo, as a disinterested party, but Devoe P. Hodson, public service commissioner, who presided at the hearing, decided that the company must sell at salvage value and not take the company's franchise and good-will into consideration. Mr. Lewis then offered to sell the road for $10,000.

Necessity for Increasing Electric Railway Fares.—*Financial America* quotes a member of the firm of E. W. Clark & Company, Philadelphia, Pa., in part as follows in regard to the question of fares on electric railways: "If street railways are to prosper and investors and the general public are to be protected, reasonable rates must be maintained. In fact, fare advances are imperative in many sections if the general demand for extensions and improvements to urban, suburban and interurban lines are to be carried out. Experts have found that the Cleveland Railway, which has a 3-cent rate, is operating at a loss; that its service is far from satisfactory, that extensions and improvements are impossible because of revenue losses, and that ultimately the rates of fare must be increased. Cheap electric railway fares have aided most in the development of the country suburbs and rural districts. The tendency nowadays is to live in the suburbs. This countryward development has been made possible by a single electric railway fare from the crowded sections. There is no desire to interfere with the growth, but the companies very naturally cannot continue these extensions unless they have the necessary capital. Reduce the income of the companies by lowering their rates of fare, and how will they finance the necessary extensions and improvements?"

Celebration by Lehigh Valley Transit Company.—On Nov. 17 the Lehigh Valley Transit Company will open what is said to be one of the largest reinforced concrete bridges ever erected by an interurban electric railway. The bridge is more than half a mile in length and cost approximately $500,000. It connects Allentown and South Allentown and is one of many improvements which the Lehigh Valley Transit Company has accomplished recently. Of the 43 miles of road north of Norristown, Pa., more than 50 per cent has been rebuilt, practically all of the new track being on private right-of-way, reducing the distance more than 3 miles and eliminating several sharp curves and heavy grades. The saving in time accomplished will enable the company to reduce its running time between Philadelphia and Allentown eighteen minutes. The company's Philadelphia division has also been protected, the entire distance, by automatic semaphore block signals, thus insuring safety and expediting the movements of trains. Steel cars are used exclusively on its high-speed interurban equipment. Among those invited to attend the opening are Mayor Blankenburg and his cabinet, of Philadelphia, and well-known Philadelphians who have been identified with the road. The party will leave the Sixty-ninth Street terminal, Philadelphia, on a special train over the Lehigh Valley Transit lines at 10.40 a. m. Nov. 17.

PROGRAMS OF ASSOCIATION MEETINGS

American Society of Mechanical Engineers

The annual meeting of the American Society of Mechanical Engineers will be held in the Engineering Societies Building in New York, Dec. 2-5. Papers will be presented on the following subjects, among others: "Boilers and Their Operation," "Cement," "Fire Protection, with Special Reference to Turbo-Generators, Oils and the Novel Use of the Sprinkler Systems," "Gas Power Engineering," "Lineshaft Bearings," "Machine Tools" and "Steel Railway Cars." A very interesting program of entertainments has been arranged. Excursion trips will be made by those in attendance at the meeting to many of the plants of the public service corporations and the large industrial establishments in the metropolitan district.

American Railway Association

The fall session of the American Railway Association will be held at the Hotel Blackstone, Chicago, Ill., on Nov. 19, 1913, at 11 a. m. Reports will be presented by the following committees: Executive committee, committee on transportation, committee on maintenance, joint committee on automatic train stops, committee on relations between the railroads, committee on the safe transportation of explosives and other dangerous articles, committee on electrical working, and committee on nominations. Three members of the committee on the safe transportation of explosives and other dangerous articles, two members of the committee on electrical working and two members of the committee on nominations are to be elected at this meeting.

Central Electric Railway Association

The following program has been announced for the meeting of the Central Electric Railway Association which is to be held at the Hotel Severin, Indianapolis, Ind., on Nov. 20 and 21, 1913:

Thursday, Nov. 20, 9 a. m.

Business session and reports of committees.

Paper, "The Permanent Security of Bolted-up Construction," by John B. Seymour, Western Manager of the National Lock Washer Company, Chicago, Ill.

Paper, "Forged Steel Wheels and Steel-Tired Wheels," by E. F. Berger, of the Midvale Steel Company, Chicago, Ill.

Paper, "Chilled-Iron Wheels for Electric Railway Service," by W. A. Bennett, representative of the Griffin Wheel Company, Chicago, Ill.

Friday, Nov. 21, 9 a. m.

Business session and reports of committees.

Paper, "The Relation of the Traffic Department to the Company," by J. F. Starkey, general passenger agent of the Lake Shore Electric Railway, Sandusky, Ohio.

Paper, "Industrial Arbitration," by Thomas Duncan, chairman of the Public Service Commission of Indiana, Indianapolis, Ind.

Financial and Corporate

Stock and Money Markets

Nov. 12, 1913.

The early trading on the New York Stock Exchange to-day showed pronounced activity and strength, but from early afternoon until the close trading was slow and fluctuations of the majority of the issues were confined within fractional limits. Rates in the money market to-day were: Call, 3½@4 per cent; sixty and ninety days, 4½@5¼ per cent; four, five and six months, 4½@5 per cent.

A strong tone was displayed on the Philadelphia Stock Exchange to-day. Philadelphia Rapid Transit closed at 19¼@19½.

The trading in the Chicago market to-day was narrow, but the volume of transactions was large. Chicago Railways bonds sold to the amount of $10,000, and participation certificates, series 2, to the extent of 220 shares.

Fractional advances were recorded on the Boston Stock Exchange to-day, but dealings were small. The tone at the end was steady.

Business was almost at a standstill in the stock market in Baltimore to-day.

Quotations of traction and manufacturing securities as compared with last week follow:

	Nov. 5	Nov. 12
American Brake Shoe & Foundry (common)	88½	88½
American Brake Shoe & Foundry (preferred)	129½	128
American Cities Company (common)	36	36
American Cities Company (preferred)	62¾	63
American Light & Traction Company (common)	328	332
American Light & Traction Company (preferred)	104½	105
American Railways Company	38⅞	38⅞
Aurora, Elgin & Chicago Railroad (common)	40	a42
Aurora, Elgin & Chicago Railroad (preferred)	84¾	83
Boston Elevated Railway	82½	82
Boston Suburban Electric Companies (common)	7	7
Boston Suburban Electric Companies (preferred)	59	60
Boston & Worcester Electric Companies (common)	a10	6½
Boston & Worcester Electric Companies (preferred)	39	38
Brooklyn Rapid Transit Company	86½	86½
Capital Traction Company, Washington	114¼	112
Chicago City Railway	160	160
Chicago Elevated Railways (common)	25	25
Chicago Elevated Railways (preferred)	75	75
Chicago Railways, ptcptg., ctf. 1	a92	a92
Chicago Railways, ptcptg., ctf. 2	28½	26
Chicago Railways, ptcptg., ctf. 3	7	7
Chicago Railways, ptcptg., ctf. 4	2½	2½
Cincinnati Street Railway	106	105
Cleveland Railway	103¼	103½
Cleveland, Southwestern & Columbus Ry. (common)	*5½	*5½
Cleveland, Southwestern & Columbus Ry. (preferred)	*30	*30
Columbus Railway & Light Company	18	18
Columbus Railway (common)	59½	59½
Columbus Railway (preferred)	88	88
Denver & Northwestern Railway	111	111
Detroit United Railway	a80	a80
General Electric Company	140	140½
Georgia Railway & Electric Company (common)	120½	119
Georgia Railway & Electric Company (preferred)	85½	85
Interborough Metropolitan Company (common)	14⅜	14⅛
Interborough Metropolitan Company (preferred)	57¾	58
International Traction Company (common)	*40	*40
International Traction Company (preferred)	95	*95
Kansas City Railway & Light Company (common)	*22	*22
Kansas City Railway & Light Company (preferred)	*30	*30
Lake Shore Electric Railway (common)	*7	*7
Lake Shore Electric Railway (1st preferred)	*92	*92
Lake Shore Electric Railway (2d preferred)	*25	*25
Manhattan Railway	128⅝	129⅞
Massachusetts Electric Companies (common)	11¼	11
Massachusetts Electric Companies (preferred)	67	66
Milwaukee Electric Railway & Light Co. (preferred)	100	100
Norfolk Railway & Light Company	*25¼	*25¼
North American Company	71	70
Northern Ohio Light & Traction Company (common)	66¼	66¼
Northern Ohio Light & Traction Company (preferred)	97	97
Philadelphia Company, Pittsburgh (common)	39	39¾
Philadelphia Company, Pittsburgh (preferred)	39	39
Philadelphia Rapid Transit Company	23	19⅞
Portland Railway, Light & Power Company	*56	*56
Public Service Corporation	108	107
Third Avenue Railway, New York	39¾	39¼
Toledo Traction, Light & Power Company (common)	30	30
Toledo Traction, Light & Power Company (preferred)	80	80
Twin City Rapid Transit Co., Minneapolis (common)	103¾	104
Union Traction Company of Indiana (common)	13	*13
Union Traction Company of Indiana (1st preferred)	83	*83
Union Traction Company of Indiana (2d preferred)	25	*25
United Rys. & Electric Company (Baltimore)	25½	25½
United Rys. Inv. Company (common)	18	18
United Rys. Inv. Company (preferred)	36½	35
Virginia Railway & Power Company (common)	a56	a56
Virginia Railway & Power Company (preferred)	94	93¼
Washington Ry. & Electric Company (common)	92	92
Washington Ry. & Electric Company (preferred)	89	89
West End Street Railway, Boston (common)	69	70
West End Street Railway, Boston (preferred)	a89	89
Westinghouse Elec. & Mfg. Company	66½	65¾
Westinghouse Elec. & Mfg. Company (1st preferred)	109	110

*Last sale. a Asked.

ANNUAL REPORTS

Columbus, Delaware & Marion Railway

The report of Eli M. West, receiver of the Columbus, Delaware & Marion Railway, Cincinnati, Ohio, presented to the Court of Common Pleas of Franklin County, contains the following statement of earnings and expenses of the company for the fiscal years ended June 30, 1912, and 1913:

Income from operation:	1913	1912
Passenger earnings	$222,042	$209,382
Package and baggage	725	721
United States mail	250	271
Express	7,620	8,091
Milk	6,220	6,707
Freight	23,996	25,441
Rent of tracks and terminals	2,518	3,368
Advertising	688	605
Rent of land and buildings	808	427
Income from other sources	16,522	11,035
Delaware city railway	14,563	14,869
Marion city railway	74,031	62,652
Marion light and power department	71,046	59,065
Gross income from operation	$441,029	$402,634
Operating expenses:		
Maintenance—way and structures	$39,792	$38,363
Maintenance—equipment	20,397	20,391
Operation of power plant	62,679	60,000
Operation of cars	79,989	74,957
General expenses	47,354	41,333
	$250,211	$235,044
Net income from operation	$190,818	$167,590
Fixed charges:		
Bond interest	$124,050	$124,425
Deferred interest	2,843	2,784
Power company sinking fund	5,000	5,000
Taxes	14,677	12,586
Excise tax (Ohio)	5,286	4,828
Federal excise tax	227	43
Other deductions:		
Eli M. West, receiver (on account)	$6,500	$3,100
Receiver's expense account	400	500
Receiver's legal expenses	3,186	4,149
	$162,169	$157,415
Surplus to profit and loss	$28,649	$10,175

Mr. West says in part:

"The unprecedented flood of last March 24 destroyed property of the approximate value of $20,000, and, in addition, entailed a great increase of operating expenses. The operation of the property was almost wholly suspended for several days, and through traffic was not resumed until April 19. During this time the loss of earnings was at least $20,000.

"Work has been begun on the building of a new carhouse for the carpentry and painting department, the old carhouse having been almost entirely destroyed by the flood. The coal bins have been entirely rebuilt and greatly enlarged. The improvement at Summit Street and Mock Road in the city of Columbus has been completed, and the Motz Bridge, the second largest on the line, has been filled.

"Work has been started on the construction of the new Fourth Street viaduct in the city of Columbus, and car traffic will not be suspended during the construction of this viaduct. The lease for the station building on West Gay Street in the city of Columbus, which expired during the year, was renewed under an option in the lease.

"To meet the growing demand for service between North Columbus and Clintonville a street car has been placed in service between these points on a fifteen-minute schedule. The permanency of this service will depend upon its success from an earning standpoint. Two miles of main line track were ballasted during the year, and all of the bridges overhauled at great expense. The expense for bridge renewals is large, but these expenses must continue until some arrangement is made for the filling of the bridges. During the year a deed was procured for the fee of the Glenmary Park property, which is one of the very best assets of the road. A new dam was constructed in the park during the latter part of the fiscal year.

"Additional condenser pumps were purchased for the power plant at Stratford, together with an additional rotary armature and an additional transformer, at a total cost of $5,000.

"Almost the entire right-of-way of the company in Prospect is being paved at a large expense to the property. New switches and double track have been installed at the Court House Square on Center Street in Marion, Ohio, and the right-of-way repaved.

"The contract for the lighting of the strects and public places and buildings of Marion has been renewed for a period of five years, ending Sept. 1, 1918, and a new schedule of rates for electric current has been filed and approved by the Public Utilities Commission. During the year consent was obtained for the borrowing of money to install a new generating plant in Marion, and the work of installation is well advanced. When completed this auxiliary plant will be a 750-kw turbine plant, which will permit active soliciting of additional power business in the city of Marion.

"Permission was also granted during the year to borrow $20,000 to aid in meeting the interest due on the first mortgage bonds of the Columbus, Delaware & Marion Electric Railroad, due May 1, just subsequent to the flood. While this money went directly to the payment of bond interest, it was in fact used to replace funds expended to take care of flood loss.

"In spite of the flood loss, the State Tax Commission increased the valuation for taxation purposes from $1,267,210 to $1,514,350. This will increase the annual general taxes approximately $2,500, and for the coming year the company will pay an approximate total of $17,000 for taxes, against a total of $8,500 three years ago. In addition to this a percentage of 1.2 on the gross earnings must be paid to the State."

The report also contains the following comparative traffic statistics:

	1913	1912
Main line (interurban):		
Total car mileage	845,789	880,218
Total revenue passengers carried	1,451,491	1,314,260
Average fare, revenue passengers	$0.153	$0.159
Operating revenue per car mile	.333	.302
Operating expenses per car mile	.194	.181
Ratio—expenses to earnings	.582	.599
Delaware city railway:		
Total car mileage	206,768	196,685
Total revenue passengers carried	297,263	305,926
Total transfers from main line	16,294	15,382
Operating revenue per car mile	$0.070	$0.076
Marion city railway:		
Total car mileage	413,065	360,605
Total transfers from main line	9,664	9,216
Operating revenue per car mile	$0.179	$0.174

Pacific Gas & Electric Company

The statement of income, profit and loss of the Pacific Gas & Electric Company, San Francisco, Cal., for the year ended Dec. 31, 1912, is as follows:

Gross earnings		$14,473,525
Deduct:		
Maintenance	$1,085,959	
Operating, distribution and administration expenses	7,345,602	8,431,561
		$6,041,964
Add:		
Profit on merchandise sales and miscellaneous income		271,127
		$6,313,091
Deduct:		
Interest on floating debt	$11,752	
Interest on bonds outstanding	3,464,326	
Interest on bonds in hands of trustees of sinking funds	92,865	
Proportion for year 1912 of discount and expenses of general and refunding bonds sold and premiums on general mortgage and collateral trust bonds and debentures redeemed	127,872	3,696,815
Net income for year before providing for depreciation		$2,616,276

According to a report submitted by A. F. Hockenbeamer, vice-president and treasurer, the following is a comparison in condensed form of the earnings, expenses, fixed charges, etc., of the company during the last six years:

Year	Gross Revenue	Operating Expenses	Taxes	Net Earnings	Interest	Balance
1907	$11,342,140	$5,978,967	$247,262	$5,115,911	$2,854,264	$2,261,647
1908	12,657,305	6,517,930	274,789	5,864,586	3,021,722	2,842,864
1909	13,491,288	7,211,517	320,059	5,959,712	2,988,522	2,971,191
1910	14,044,596	7,538,461	382,880	6,123,255	3,006,256	3,116,999
1911	14,604,609	7,697,370	516,702	6,390,537	3,254,133	3,136,404
1912	14,744,651	7,808,592	622,969	6,313,090	3,568,943	2,744,147

An analysis of the gross revenue of the company for the past six years shows that the amounts and percentages of the whole attributable to street railway sources are as follows: 1907, $431,800, or 4 per cent; 1908, $414,326, or 3 per cent; 1909, $452,396, or 3 per cent; 1910, $509,152, or 4 per cent; 1911, $533,520, or 4 per cent; and 1912, $547,187, or 4 per cent.

The gross earnings during 1912, compared with 1911, increased $140,042, notwithstanding rate reductions. Charges for maintenance, operating expenses and reserves for uncollectible accounts, casualties, etc., increased $111,222; taxes increased $106,267; net revenue decreased $77,446, and interest charges increased $314,810. The company made a net gain of 33,886 consumers during the year. This is an increase of almost 12 per cent and, based upon the average gross return per consumer during 1912, represents a permanently increase gross earning capacity of between $1,200,000 and $1,400,000 per annum.

During the year there were purchased and deposited in the various mortgage sinking funds of the company bonds of the par value of $344,200, and in addition bonds of the par value of $670,000 were purchased from sinking funds and canceled by the trustees under the mortgages, making a total of $1,014,200 par value of bonds retired through sinking fund operations during the year. The sinking funds held at the close of the year $60,300.41 of uninvested cash.

The following table shows the condition at the close of the year 1912 of sinking funds established under various mortgages as compared with the condition of sinking funds at Dec. 31, 1911:

	1912	1911
Par value of bonds held in sinking funds	$2,056,200	$1,712,000
Bonds canceled under sinking fund provisions	4,042,490	3,381,490
Uninvested cash on hand at close of year	60,300	7,671
Total	$6,158,990	$5,101,161

During the year the expenditures of the company for the acquisition of the properties of other companies amounted to $290,948 in cash and $60,000 in stock, and it expended directly upon its own properties for additions, improvements and betterments the sum of $7,470,763, making its total capital expenditures during the year $7,821,712.

John A. Britton, vice-president and general manager, says in part:

"On March 23, 1912, the activities of the company came under the California Railroad Commission, excepting in the matter of rates to be charged for service, the authority of the commission in this respect extending only to territory without the limits of incorporated cities and towns. The cities still retaining and exercising that power, there is a dual authority, awkward and unsatisfactory, as but approximately 4 per cent of our entire consumers affected by rate regulation are under the commission. It is to be hoped that future legislation will change this condition.

"The company has adopted the policy of carrying its own fire insurance, and through the department having the care of perishable property has instituted safeguards and precautions to prevent fires. With what excellent results this has been done may be indicated by the minimum of loss in 1912, the total losses being $310, the number of fires 24. The total insurance carried on all properties aggregates $490,953 and premiums $6,987.15.

"The average number of employees during the year was 6111, a gain of 1784 over 1911, the total pay roll amounting to $5,845,939.

"It is worthy of note that this company has secured the exclusive contract to furnish light, heat and power to the Panama-Pacific International Exposition Company, 'pre,' 'post' and exposition periods, at a remunerative figure. The installation at the exposition will call for a maximum demand of 20,000 hp."

New Officers Elected for Manhattan Railway

At the annual meeting of the stockholders of the Manhattan Railway, which is leased to the Interborough Rapid Transit Company, New York, N. Y., J. D. Rockefeller, Jr., Edgar L. Marston, Starr J. Murphy, Jerome D. Greene, E. G. Snow, Alvin W. Krech and Henry C. Phipps were elected directors to succeed Kingdon Gould, J. H. McClement, Jay Gould, Frank Jay Gould, Howard Gould, Alfred Skitt and John T. Terry, deceased. Edgar L. Marston was elected president of the company to succeed George Jay Gould. The following officers and committees were elected: President, Edgar L. Marston; vice-president, John McClement; secretary and treasurer, D. W. McWilliams; counsel, Murray, Prentice & Howland. The following executive committee was appointed: Edgar L. Marston, ex officio; George Jay Gould, Edwin Gould, William A. Day and Starr J. Murphy.

Messrs. Gould and Messrs. Jeffery and Gallaway repre-

sent the holdings of the Gould estate, Mr. Rockefeller the holdings of the Rockefeller family and of the University of Chicago; Messrs. Marston, Murphy and Greene represent respectively the General Education Board, the Rockefeller Foundation and the Rockefeller Institute for Medical Research, of which they are severally members; Judge Day the Equitable Life Assurance Society, of which he is the president; Mr. Snow the Home Insurance Company, of which he is president; Mr. Krech the Equitable Trust Company, of which he is president; Mr. Slocum the holdings of Mrs. Russell Sage, whose brother he is, and Mr. Phipps the holdings of the Bessemer Investment Company.

Last July Mr. Rockefeller and Mr. Gould, representing the two largest stockholding interests in the Manhattan Railway, agreed that they would co-operate in inviting to seats in the board the representatives of the principal stockholding interests, asking them so far as possible to select their chief executive officers for these positions.

Mr. Gould, who served the company for twenty years as its president, expressed a desire to retire at the end of his term of office, and in view of the fact that the next largest stockholding interest outside of Messrs. Gould and Rockefeller is the general education board, of whose finance committee Edgar L. Marston of the banking firm of Blair & Company is chairman, it was decided to recommend to the new board the election of Mr. Marston as president.

At the meeting of stockholders, which was held on Nov. 12, the resolution calling for the creation of a second mortgage to secure $5,490,000 of second mortgage 4 per cent bonds was ratified. In compliance with the provisions of the lease of 1903 the bonds secured by the new mortgage will be turned over to the Interborough Rapid Transit Company for expenditures for improvements and betterments.

Changes in American Cities Company

Ford, Bacon & Davis, formerly operators of the American Cities Company and its subsidiaries, have disposed of their holdings in the company and will terminate their connection as operators of the properties on Dec. 1. In the future the United Gas & Electric Corporation, in which Ford, Bacon & Davis are interested, will operate the American Cities Company. George W. Bacon has been elected a director of the United Gas & Electric Corporation.

At a meeting of the directors of the American Cities Company, in New Orleans, Hugh McCloskey was elected president, succeeding George H. Davis, resigned. Mr. McCloskey was also elected chairman of the board of directors of the New Orleans Railway & Light Company. J. S. Pevear, formerly vice-president of the International Railway, Buffalo, has been elected vice-president of the New Orleans Railway & Light Company. The changes will take effect on Dec. 1.

Early in October the stockholders of the United Gas & Electric Corporation ratified the plan providing for the acquisition of the common stock of the American Cities Company. It was proposed to create a new class of stock, second preferred, and to issue $12,500,000 of this, increasing the corporation's capital from $45,000,000 to $57,500,000. The cumulative preferred dividend on this stock is to be 2 per cent for 1914, the rate being increased annually by 1 per cent until a rate of 6 per cent is reached, at which it will be continued. The purchase of American Cities stock is understood to have been made by the exchange of seventy-five shares of the new second preferred stock and twenty-five shares of the common stock of the United Gas & Electric Corporation for each 100 shares of the common stock of the American Cities Company.

The United Gas & Electric Corporation has large holdings of securities in public utilities furnishing principally electric lighting and gas service, but including several operating street railways. Among the railway systems which it controlled prior to the acquisition of the American Cities Company common stock were the Lancaster County Railway & Light Company and the International Railway. The American Cities Company controls among other companies the New Orleans Railway & Light Company, Birmingham Railway, Light & Power Company, Little Rock Railway & Electric Company, Memphis Street Railway, Knoxville Railway & Light Company and the Houston Lighting & Power Company.

American Water Works & Guarantee Company, Pittsburgh, Pa.—According to the *Wall Street Journal* it is proposed in the plans which are being made for the reorganization of the American Water Works & Guarantee Company to keep the irrigation properties under the present corporation, arrange for funds to carry on the work of completing the developments now under way and to take up the work of securing settlers for the irrigated lands. The engineers selected by the protective committee are said to have completed their reports on the condition, earnings and future possibilities of the water supply, the electric railway, electric light and power irrigation properties. These are now in the hands of the committee.

Augusta-Aiken Railway & Electric Corporation, Augusta, Ga.—The entire holdings of the North Augusta Land Company and the Hampton Terrace Hotel property have been sold to James U. Jackson and Ernest E. Floyd, of Chicago, and associates. The North Augusta Land Company and the Hampton Terrace Hotel property have been owned by the Augusta-Aiken Railway & Electric Corporation. Mr. Jackson, who is a member of the purchasing syndicate, was at one time vice-president of the Augusta Railway & Electric Company, which was succeeded by the Augusta-Aiken Railway & Electric Corporation.

Belt Line Railway Corporation, New York, N. Y.—The Belt Line Railway Corporation, operating the Fifty-ninth Street and Belt Line street railroads, has been authorized by the Public Service Commission for the First District of New York to increase its capital stock from $600,000 to $750,000. The company had already issued, under authority of the commission, $481,000, and recently applied for permission to increase the total amount of stock in the sum named and also for authority to issue $269,000 of stock to pay for the acquisition of seventy-nine storage battery cars. This amount, with the amount already issued, would make a total of $750,000. The company had already expended $128,090 for the purchase of forty storage battery cars, the money being borrowed from the Third Avenue Railway. The Belt Line Corporation wants to buy thirty-nine additional cars of the same type, and the cost is estimated at about $3,200 a car, or $124,800. These two amounts make a total of about $253,000, and the commission's order authorizes the company to issue capital stock to that extent. The order also authorizes the Third Avenue Railway, which owns all the bonds and stock of the Belt Line Corporation, to acquire and hold all of the new capital stock of the latter corporation authorized.

Bowling Green (Ky.) Railway.—The Court of Appeals of Kentucky has upheld the movement to throw the Bowling Green (Ky.) Railway into the hands of a receiver. The administrator of Herman Lewis secured a judgment for $6,000 against the company, and the directors, by resolution, declared the company to be insolvent and ordered that a receivership be applied for. The Fidelity & Columbia Trust Company, Louisville, Ky., representing the holder of $19,000 of mortgage bonds of the railway, was a party to the receivership proceedings and entered a motion that a receiver be appointed. The administrator for Mr. Lewis demurred, but his demurrer was overruled both in the Circuit Court and by the Court of Appeals. The receivership will now be authorized.

Caldwell (Idaho) Traction Company.—It is reported that the Oregon Short Line Railroad has purchased the holdings of the Caldwell Traction Company, which include about 20 miles of electric railway.

Chicago (Ill.) Railways.—The Chicago *Economist* says that the protective committee of stockholders of the Chicago Railways has advised those who gave the committee proxies for the annual election to vote for the unification of the Chicago Railways and the Chicago City Railway as it is to be submitted to the certificate holders. The *Economist* says: "The argument of the members of the protective committee is that Mr. Blair as head of the two systems will see that the certificate holders of the Chicago Railways, his old company, will receive equitable consideration. However, their support seems to be a matter of indifference to the management." As stated in the Electric Railway Journal of Nov. 1, 1913, page 998, the protective committee marshalled proxies for 41,567 participation certificates out of a total of 212,523 at the recent annual meeting of the company.

Chicago & Milwaukee Electric Railroad, Highwood, Ill.—The argument before Judge Geiger at Milwaukee on the petition of John Griffith, owner of $200,000 of the $10,000,000 bonds issued by the Chicago & Milwaukee Electric Railway, for an order enjoining the reorganization committee from bidding at the resale of the road has been completed and the court has taken the petition under advisement.

Columbus, Urbana & Western Electric Railway, Columbus, Ohio.—The receiver of the Columbus, Urbana & Western Electric Railway has applied to the courts at Columbus for an order of sale of the property.

Cumberland County Power & Light Company, Portland, Me.—The Cumberland County Power & Light Company has obtained control of the York Power Company. When the necessary transmission lines can be completed it is the intention to supply the territory previously served by the York Power Company from the water-power plants of the Cumberland County Power & Light Company, using the steam station of the York Power Company for reserve only.

Denver (Col.) City Tramway.—Claude K. Boettcher, chairman of the board of directors of the Denver City Tramway, has issued a statement, in part, as follows: "Whatever financing or refinancing has been necessary in the affairs of the Denver City Tramway has been accomplished. Reports to the effect that changes in ownership or control of the property are imminent at this time are without foundation. All interests concerned in the ownership of the company are working in harmony and with complete understanding. No radical changes in the affairs of the company are contemplated."

Fayetteville Street Railway & Power Company, Fayetteville, N. C.—The Fayetteville Street Railway & Power Company, which is controlled by the Consolidated Railway & Power Company, has been placed in the hands of H. L. Brothers, Fayetteville, N. C., as receiver, by Judge C. C. Lyon of the Superior Court at Fayetteville on application of the Kalby Frog & Switch Company, Birmingham, Ala.

Halifax Electric Tramway, Ltd., Halifax, N. S.—The Public Utilities Commission has authorized the Halifax Electric Tramway to issue 6000 shares of ordinary stock at par. The additional capital will provide funds for extensions and to retire outstanding bonds.

Idaho Railway, Light & Power Company, Boise, Idaho.—The Idaho Railway, Light & Power Company is reported to have purchased the property of the Beaver River Power Company for about $500,000.

Interborough Rapid Transit Company, New York, N. Y.—The Stock Exchange has been informed by the Interborough Rapid Transit Company that all but 121 of the old Metropolitan Street Railway refunding 4 per cent bonds have been acquired by the Interborough-Metropolitan Company under the reorganization plan, and by the Farmers' Loan & Trust Company that there are outstanding only $219,000 of certificates of deposit for these bonds. For this reason the committee on listing of the exchange has struek these bonds and certificates from the list.

International Railway, Buffalo, N. Y.—The International Railway has applied to the Public Service Commission of the Second District of New York for permission to issue $1,464,161 of additional refunding and improvement 5 per cent bonds. The proceeds of the issue is to be used to refund the $600,000 of Niagara Falls Park & River Railway first mortgage 5 per cent bonds due Jan. 2, 1914, and for capital expenditures during 1914.

Joliet & Southern Traction Company, Joliet, Ill.—Judge Duane J. Carnes, of the Kane County Circuit Court, sitting at Sycamore, has refused to pass on the valuation by Master in Chancery Sears of the terminal properties of the Joliet & Southern Traction Company. As a result, the sale of the railroad will be postponed. The sale was to have been held at Geneva on Nov. 17.

Kansas City Railway & Light Company, Kansas City, Mo.—The committee of holders of the first lien refunding 5 per cent bonds of the Kansas City Railway & Light Company which matured on May 15, 1913, announces that it has arranged for the payment by the company at the office of the New York Trust Company, New York, N. Y., of the interest due on Nov. 15, 1913, on certificates of deposit as well as on the bonds.

Mexico Tramways, Mexico City, Mex.—The Mexico Tramways has decided to issue $6,000,000 of 6 per cent three-year notes convertible during this period into stock at par. All of the authorized capital stock of the company being now outstanding, it is proposed to increase the stock by $10,000,000, of which $6,000,000 will be devoted to the conversion of the notes and the remaining $4,000,000 will be reserved for future needs, none thereof to be issued at present. The stockholders will vote on Nov. 20 on increasing the capital stock of the company from $20,000,000 to $30,000,000.

New York Municipal Railway Corporation, Brooklyn, N. Y.—The Public Service Commission of the First District of New York has granted the New York Municipal Railway Corporation an extension of time until Nov. 30 for the issuance of $400,000 of capital stock, which has already been authorized.

Oakland, Antioch & Eastern Railway, Oakland, Cal.—President Bush of the Western Pacific Railroad, accompanied by representatives of the New York banking houses of Speyer & Company, Blair & Company and Salomon & Company, arrived in San Francisco on Nov. 6 after an inspection of the Oakland, Antioch & Eastern Railway, which operates between San Francisco and Sacramento. Another purchase said to be contemplated by the Western Pacific Railroad is the Nevada County Narrow Gage Railroad, which will connect with the Oakland, Antioch & Eastern Railway when the latter is extended to Colfax. The Oakland, Antioch & Eastern Railway has been authorized to purchase from the Northern Electric Railway for $11,403 a half interest in certain tracks of the Northern Electric Railway. These lie on M Street in Sacramento between the point where the single track of the Northern Electric Railway leaves the M Street bridge and a point between Second and Third Streets, which point is the beginning of a curve of 165 ft. radius leaving the track at that point and turning northerly upon Third Street. The only condition is that the price to be paid for the half interest shall not be used before the commission or any other public authority as representing, for rate fixing or other purposes, the true value of a half interest in the property.

Poland (Ohio) Street Railway.—The Poland Street Railway, which is building a line between Youngstown and the village of Poland, has asked the Public Service Commission of Ohio to permit it to lease the tracks and property, when completed, to the Mahoning Valley Railway for a term of twenty years. The leasing company is to pay the interest on bonds outstanding, taxes, insurance, maintenance, special government charges and keep the line in repair.

Puget Sound Traction, Light & Power Company, Seattle, Wash.—A circular has been sent out to stockholders of the Puget Sound Traction, Light & Power Company offering holders of record Nov. 3 the right of subscription to $2,686,200 of the authorized but unissued capital stock of the company. Stockholders recently authorized the issue of this stock. Each stockholder may subscribe at $100 per share for one-eleventh of a share of new preferred for each $100 of preferred or common of record Nov. 3. For purposes of subscription, fractional share warrants aggregating eleven rights and multiples thereof should be presented at the office of the transfer agent and exchanged for whole share warrants. Subscriptions will be payable on or before Dec. 8, 1913. Certificates for full-paid shares will be ready for delivery on Dec. 18, which shares will carry dividends after that date.

Salt Lake & Ogden Railway, Salt Lake City, Utah.—The Salt Lake & Ogden Railway has sold to New York bankers $200,000 of first mortgage 5 per cent escrow bonds. This is part of an authorized issue of $2,000,000, of which $1,150,000 had been previously issued and $650,000 are held in the treasury. The proceeds of the bonds will be used to pay part of the cost of double tracking which has been made necessary by increased traffic. The bonds are a first lien upon all the company's properties and franchises and the $65,000 treasury bonds may only be issued for 75 per cent of the cost of permanent extensions and additions to the property, provided the net earnings of the company for the twlve months preceding have equaled twice the annual bond interest charge.

United Properties Company, Oakland, Cal.—R. G. Hanford and William H. Tevis have placed before the trustees of the United Properties Company and F. M. Smith the plan for the refinancing of the traction and lighting companies controlled by the United Properties Company and Mr. Smith. Under the plan Mr. Hanford and Mr. Tevis propose to pay Mr. Smith $1,000,000 in cash for his stock in the United Properties Company, to pay off the loan made by N. W. Halsey & Company to the Oakland Terminal Railways of $2,500,000 and the Oakland Terminal Company note of $1,125,000, to pay the floating debt of the railways, to take care of the collateral trust notes of the United Water & Light Company on which the interest is due Dec. 1, to pay all other debts of the United Properties Company and its subscribers, amounting, with the above, to about $5,200,000, and to furnish $750,000 in cash for immediate development of the water and light companies.

Dividends Declared

Central Arkansas Railway & Light Company, Hot Springs, Ark., quarterly, 1¾ per cent, preferred.

Federal Light & Traction Company, New York, N. Y., quarterly, 1½ per cent, preferred.

Norfolk Railway & Light Company, Norfolk, Va., 3 per cent.

Pacific Gas & Electric Company, San Francisco, Cal., quarterly, 1½ per cent, preferred.

Rochester Railway & Light Company, Rochester, N. Y., quarterly, 1¼ per cent, preferred.

ELECTRIC RAILWAY MONTHLY EARNINGS

BANGOR RAILWAY & ELECTRIC COMPANY, BANGOR, MAINE.

Period			Gross Earnings	Operating Expenses	Net Earnings	Fixed Charges	Net Surplus
1m.,	Sept.,	'13	$68,457	*$28,780	$39,677	$17,356	$22,321
1 "	"	'12	66,175	*26,274	39,901	16,620	23,281
12 "	"	'13	749,593	*342,103	407,490	207,134	200,356
12 "	"	'12	682,795	*308,278	374,517	188,967	185,550

BERKSHIRE STREET RAILWAY, PITTSFIELD, MASS.

1m.,	Sept.,	'13	$91,591	$71,763	$19,828	$4,896	$14,932
1 "	"	'12	88,256	77,482	10,774	5,423	5,351
3 "	"	'13	306,361	213,518	92,843	13,929	78,914
3 "	"	'12	289,229	217,145	72,084	16,124	55,960

CHATTANOOGA RAILWAY & LIGHT COMPANY, CHATTANOOGA, TENN.

1m.,	Sept.,	'13	$117,882	*$64,686	$53,196	$25,327	$27,869
1 "	"	'12	94,808	*56,265	38,543	22,596	15,947
12 "	"	'13	1,190,488	*704,035	486,453	289,280	197,173
12 "	"	'12	1,028,582	*612,554	416,028	258,569	157,459

CONNECTICUT COMPANY, NEW HAVEN, CONN.

1m.,	Sept.,	'13	$694,281	$468,623	$225,658	$46,557	$179,101
1 "	"	'12	680,273	403,375	276,898	36,489	240,409
3 "	"	'13	2,367,316	1,425,326	941,990	139,669	802,321
3 "	"	'12	2,222,565	1,273,171	949,394	109,465	839,929

CUMBERLAND COUNTY POWER & LIGHT COMPANY, PORTLAND, MAINE.

1m.,	Sept.,	'13	$218,398	*$126,466	$91,932	$63,659	$28,273
1 "	"	'12	190,630	*100,872	89,758	56,960	32,798
12 "	"	'13	2,278,877	*1,268,738	1,010,139	692,916	317,223
12 "	"	'12	2,097,982	*1,219,883	878,099	626,856	251,243

EAST ST. LOUIS & SUBURBAN COMPANY, EAST ST. LOUIS, ILL.

1m.,	Sept.,	'13	$238,547	$141,429	$97,118	$49,748	$47,370
1 "	"	'12	217,962	116,893	101,069	48,556	52,513
12 "	"	'13	2,646,837	1,511,369	1,135,468	587,738	547,730
12 "	"	'12	2,374,432	1,312,497	1,061,935	570,767	491,168

NEW YORK (N. Y.) RAILWAYS.

1m.,	Sept.,	'13	$1,241,633	$739,528	$502,105	$366,348	$135,758
1 "	"	'12	1,204,264	698,443	505,821	374,335	131,486
3 "	"	'13	3,659,125	2,210,695	1,448,430	1,116,127	332,303
3 "	"	'12	3,585,774	2,139,373	1,446,401	1,127,149	319,252

NEW YORK & STAMFORD RAILWAY, PORT CHESTER, N. Y.

1m.,	Sept.,	'13	$32,686	$24,423	$8,263	$1,477	$6,786
1 "	"	'12	33,446	25,190	8,255	1,570	6,685
3 "	"	'13	134,095	80,783	53,312	4,491	48,821
3 "	"	'13	127,661	94,473	33,188	4,633	28,555

NEW YORK, WESTCHESTER & BOSTON RAILWAY, NEW YORK, N. Y.

1m.,	Sept.,	'13	$34,479	$35,972	$1,493	$16,229	†$17,721
1 "	"	'12	22,098	39,689	17,592	8,000	25,592
3 "	"	'13	102,380	113,016	10,635	35,629	†46,264
3 "	"	'12	47,534	117,011	69,478	24,062	93,539

RHODE ISLAND COMPANY, PROVIDENCE, R. I.

1m.,	Sept.,	'13	$454,747	$291,483	$163,263	$38,500	$124,763
1 "	"	'12	458,383	265,746	192,637	31,500	161,137
3 "	"	'13	1,563,225	914,883	648,342	115,500	532,842
3 "	"	'12	1,509,582	817,728	691,854	94,500	597,354

WESTCHESTER STREET RAILROAD, WHITE PLAINS, N. Y.

1m.,	Sept.,	'13	$23,799	$20,534	$3,266	$1,034	$2,232
1 "	"	'12	22,366	20,199	2,166	804	1,362
3 "	"	'13	76,492	62,725	13,766	3,157	10,609
3 "	"	'12	71,536	58,552	12,984	2,422	10,562

*Includes taxes. †Deficit.

Traffic and Transportation

Prize to Conductor for Paper on Elimination of Boarding and Alighting Accidents

The following paper, submitted by D. P. Simpson, conductor, won the first prize in a contest conducted recently under the auspices of the claim department of the Portland Railway & Light Company, Portland, Ore., in which the company offered $15 for the first prize and $8 for the second prize for the best papers on the prevention of accidents to passengers boarding and alighting from moving cars, the papers to be written by platform men:

"It is difficult to tell where to begin on this subject as a person might cite all of the 'dont's' with which all of the men who have been in the company's employ for at least one year are familiar.

"I believe that the frame of mind in which a man goes to work has much to do with the elimination of this class of accidents, or any class of accidents, with the exception of the accidents which happen even where the utmost precautions are taken. I think that if a man begins his day's work full of confidence in himself and determined to concentrate his mind on his work and give his undivided attention during the period of time he is on duty, he will reduce accidents to a minimum.

"We do our utmost to eliminate boarding and alighting accidents when we give our best thought, ability and power to the performance of our duty and do not look on our work as drudgery. No work is drudgery that is entered into in the right frame of mind. A person whose heart and soul are in his work and who is thoroughly interested, both in the work itself and in the final results, is doing his part in the elimination of such accidents.

"I think many carmen might be classed as mechanical men, performing their duty (probably) 'O. K.' with their mind and thought on some other subject. This is a poor policy to follow, as the mind should be on our work while we are on duty.

"We all know that we divide our attention and become absent-minded if we think of one thing while we are doing something else. To prevent this tendency, we should make it a rule under every circumstance to give our work our undivided attention.

"The result will be better pleased patrons, a better pleased company and the reduction of accidents."

The company proposes to hold a series of these contests. The next papers to be written by the platform men will be on the best way of preventing accidents where passengers alight from a car, walk around the rear end of the same and in front of car on the opposite track. The papers are judged by the five division superintendents.

New York Hearing on Smoking

On Nov. 6, 1913, there was continued before the Public Service Commission for the Fifth District of New York a hearing begun on Oct. 23 in reference to a petition from 72,000 smokers asking for the installation of smoking cars or compartments for smokers in the elevated and surface car lines of New York City.

Frank Hedley, general manager of the Interborough Rapid Transit Company and the New York Railways, was the principal witness. Mr. Hedley said that while he was employed on the elevated roads in Chicago the experiment of separate arrangements for smokers had been tried, but that it proved unsatisfactory for the reason that fires were started in vehicles passing the elevated on account of lighted cigars and cigarettes having been dropped by passengers. He cited the experience of the Kings County elevated line in Brooklyn, which was similar to that of the Chicago company, and also mentioned some correspondence with Fire Commissioner Joseph Johnson, who objects to the use of smoking-cars.

Mr. Hedley stated that the terminal facilities and housing accommodations of his company were not sufficient to take care of additional cars necessitated by such a move. He explained that his company had been obliged to increase its fire-fighting equipment, and if quarters were to be required for new smoking cars, more apparatus would be

needed. He would not advise the commission to issue definite orders with regard to smoking on elevated lines or surface lines. He declared that the question was one which ought to be left to the company to determine.

Mr. Hedley then said that 176 of the new stepless type of cars were soon to be added to the service, with an improved ventilating apparatus. If feasible, smoking would be permitted in a part of those cars, but any change was opposed in so far as the elevated lines were concerned.

John J. Dempsey, superintendent of the Brooklyn elevated lines, gave evidence similar to that of Mr. Hedley. William Siebert, superintendent of the surface lines of the Brooklyn Rapid Transit Company, said that the proposal to operate one car in five as a "smoker" was also impracticable, on account of the terminals and the necessity of using the smoking cars at times in the regular service.

Cleveland Interurbans Will Do Freight Business.—At the city election in Cleveland on Nov. 4 the voters approved the ordinance giving the interurban railways the right to haul freight through the streets at night.

Commissioners of Denver Opposed to Skip-Stop.—The Commissioners of Denver, Col., have authorized City Attorney Stevens to draw an ordinance forbidding the "skip-stop" system of tramway schedules on the Colfax lines of the Denver City Tramway.

International Railway Changes Rates.—Changes in one-way, round-trip and commutation fares between certain points were recently filed with the Public Service Commission of the Second District of New York by the International Railway, Buffalo, effective on Dec. 1, 1913.

Two-Car Trains in Buffalo—Two-car trains are being equipped by the International Railway, Buffalo, N. Y., and will soon be put in service on several of the cross-town lines to facilitate traffic during the rush hours. P-A-Y-E cars will be used as motor cars with near-side cars as trailers.

Traffic Agreement Suggested at Rock Island.—The City Commissioners at Rock Island, Ill., have suggested to E. C. Walsh, Jr., of the Rock Island Southern Railway that his company seek a traffic arrangement into the city over the tracks of the Tri-City Railway. Mr. Walsh agreed to open negotiations with this end in view.

Inquiry Into Service in Brooklyn.—The Public Service Commission of the First District of New York has called for hearings to be held Nov. 26 and 27, before Commissioner Williams to investigate the service on the Brighton Beach and Fulton Street elevated lines, and on all the surface lines of the Brooklyn Rapid Transit Company.

Police Powers of Railway Employees in Illinois.—A justice of the peace at Belleville, Ill., acting upon the advice of the Attorney General of the State, decided recently that conductors on electric and steam railways in Illinois have no right to carry weapons although clothed by the law with power to make arrests on their cars or trains.

Plan to Ask Fare Increase.—The Chicago & Joliet Electric Railway, Joliet, Ill., has informed the City Council of Lockport, Ill., that when its present franchise expires it will ask to be permitted to charge a 10-cent fare between Lockport and Joliet. The company declares that since the 5-cent fare was inaugurated operating expenses have so increased as to make the raise necessary.

Railway Superintendent Urges Courtesy of Employees to Public.—The superintendent of the Jacksonville Railway & Light Company, Jacksonville, Fla., has issued a letter to all the employees of the company in which he lays down a number of maxims of courtesy for daily use in the treatment of customers. As the public pays the salaries of all employees, the superintendent points out that courtesy to the public is the surest way to bring to pass the successful operation of a public utility.

Electric Competition Too Keen for Steam in Maine.—Because of the inroads which the suburban line of the Bangor Railway & Electric Company, Bangor, Me., has made into the business of the Maine Central Railroad, between Bangor and Old Town, the latter has abandoned its local steam train service between those points. The territory is served exclusively now by the Bangor Railway & Electric Company, which has equipped the line with automatic block signals. The resulting 20 per cent increase in passenger traffic has necessitated the addition of new steel cars.

Order Regarding Use of Wooden Cars on Electric Lines.—The use of wooden passenger cars on any trains in which steel cars are operated has been forbidden to the Long Island Railroad Company by the Public Service Commission of the First District of New York and the company has been instructed that it must not use wooden cars on any electrically driven trains unless it is absolutely necessary in order to maintain the schedule. After Sept. 15 next the company must not use wooden cars on any electric passenger train under any circumstances. At present the company is operating twenty-four wooden cars.

Laws Restricting Transportation of Intoxicating Liquors.—The Central Electric Traffic Association has issued a freight circular covering the laws and regulations of the various states and of the United States governing the transportation of intoxicating liquors. Indiana and Ohio railroads are forbidden to transport intoxicating liquors under false names. In prohibition localities of Michigan the railroads are required to keep a close record of all shipments of liquor, including a statement of the special purpose allowed by law, such as medicinal purposes, under which the liquor is intended to be used. The regulations in regard to interstate shipments make it unlawful for railroads to transport intoxicating liquors from one state to prohibited areas in any other state.

St. Augustine Street Cars Resume Schedule.—The St. Johns Electric Company, St. Augustine, Fla., resumed its street schedules on Nov. 8 on the strength of an order enjoining Mayor Corbett from interfering with the traffic of the company. The case has grown out of a controversy as to the payment of the percentage of the gross receipts of the company to the city. It was claimed that these payments had not been made in accordance with the terms of the franchise. Mayor Corbett ordered the car service to be stopped with the object in view of bringing about a settlement. Officials of the traction company state that they have been ready to make the right settlement with the city, but that the city officials had never appointed an auditor to go over the company's books to arrive at a settlement.

Award of Worcester and Springfield Arbitration Board.—The decision of the arbitration board, composed of William P. Hayes for the employees; Bentley W. Warren for the Springfield Street Railway and the Worcester Consolidated Street Railway, and Henry V. Cunningham, the neutral member, made its finding public on Nov. 10. The board was called upon to interpret the nine-hours-in-eleven law. In the case of 20 per cent of the men the runs will provide for a day's work of nine hours completed within eleven as provided for in the new act. In the case of another 20 per cent the runs will remain as under the old agreement, nine and one-half hours completed within twelve. The arbitration board has arranged that the rest of the runs shall either be nine hours completed in eleven and one-half hours, nine hours completed in twelve hours, or nine and one-half hours completed in eleven hours, each separate class being 20 per cent of the whole. Provision is made for excess payment and for allowing any man who so desires to work additional hours for compensation.

Re-routing of Chicago Elevated Trains.—The proposed re-routing of the elevated trains in Chicago was carried out on Nov. 3 under the plan outlined at length in the Electric Railway Journal of Nov. 1, 1913, page 1001. The re-routing is in accordance with the provisions of the ordinance passed by the City Council on July 21, 1913, which provides for universal transfers and a single 5-cent fare throughout the city. The change in the method of operating the trains was attended with comparatively little confusion or delay when the magnitude of the undertaking is taken into account. E. C. Noe, assistant general manager of the Chicago Elevated Railways, is quoted as follows: "I believe this change is the most colossal one that has ever been attempted by any traction company in the world. We have changed over night the entire system of four railroads, running one train a minute. Not only have we changed the system, but three of the roads are running on the loop in an entirely different way from that in which they have been running hitherto. Only the Metropolitan trains are running as they formerly did."

Personal Mention

Mr. Paul C. Martin has been elected president of the Springfield (Ohio) Railway to succeed his father, the late Oscar T. Martin.

Mr. Charles K. Wheeler, attorney for the Paducah Traction & Light Company, Paducah, Ky., has been elected chairman of the board of directors of the company.

Mr. Charles Madden has been appointed assistant secretary and assistant treasurer of the West Virginia Traction & Electric Company, Wheeling, W. Va., and affiliated companies.

Mr. C. D. Junkens has resigned as treasurer of the City Railway and the City & Suburban Gas Company, Wheeling, W. Va., and as assistant treasurer of the Wheeling Traction & Electric Company.

Mr. F. R. Hanson has resigned as master mechanic of the Sterling, Dixon & Eastern Electric Railway, Dixon, Ill., to accept the position of general superintendent of the Northern Illinois Electric Railway, with headquarters at Amboy, Ill.

Mr. F. E. Cole, for several years superintendent of the Louisville & Northern Railway & Lighting Company and the Louisville & Southern Indiana Traction Company, New Albany, Ind., has become connected with the Northwestern Elevated Railroad, Chicago.

Mr. Edgar L. Marston, of the banking firm of Blair & Company, New York, N. Y., has been elected president of the Manhattan Railway, New York, operated under lease by the Interborough Rapid Transit Company. Mr. Marston succeeds Mr. George J. Gould as president of the company.

Mr. A. P. Campbell, private secretary to Mr. Franklin T. Griffith, president of the Portland Railway, Light & Power Company, Portland, Ore., has resigned from the company to act in the capacity of private secretary to Mr. B. S. Josselyn in connection with Mr. Josselyn's new duties in the East.

Mr. B. J. Jones, formerly general manager of the Ohio Electric Railway, Cincinnati, Ohio, has been appointed general manager of the Tri-State Railway & Electric Company, East Liverpool, Ohio, as successor to Mr. W. R. W. Griffin. Mr. Jones has had a wide experience in the installation and operation of large electric railway and lighting systems. He supervised the installation of some of the early electric railways from 1889 to 1894.

Mr. George J. Gould, who for twenty years has been president of the Manhattan Railway, New York, N. Y., the property of which is leased to the Interborough Rapid Transit Company, resigned from the company at the annual meeting of the stockholders on Nov. 12. Mr. Gould's retirement from the company as president was in accordance with his desire expressed some time ago to be relieved of the responsibility connected with the office.

Mr. A. N. Dutton, who has been vice-president of the West Virginia Traction & Electric Company and manager of the City Railway, Wheeling, W. Va., has been elected president of the City Railway and the City & Suburban Gas Company, Wheeling. He succeeds Mr. H. R. Warfield as president of the City Railway and Mr. J. B. Taylor with the City & Suburban Gas Company. Mr. Taylor becomes vice-president of the City & Suburban Gas Company.

Mr. J. Gerry Dobbins has been appointed auditor of the Hudson & Manhattan Railroad, New York, N. Y., to succeed Mr. F. H. Sillick, who has been appointed comptroller of the company. Mr. Dobbins was graduated from Amherst College. When the Hudson & Manhattan was placed in operation in 1908 Mr. Dobbins became an assistant paymaster and clerk in the accounting department. He later was appointed successively chief clerk of the accounting department and assistant auditor.

Mr. A. B. Coryell has been appointed general superintendent and purchasing agent of the Moncton Tramway & Electric Light Company, Moncton, N. B., in full charge of maintenance and operation, succeeding Mr. H. N. Price, resigned. Mr. Coryell has been engaged in the railway and lighting business for twenty-two years. He supervised the construction of the street railway systems at Greenville, Tex., and Waycross, Ga., and was manager of the companies at both of these places. The property at Moncton is owned by Pittsburgh capitalists.

Mr. Albert H. Stanley, managing director of the London Electric Railway, London United Tramways, Ltd., the Metropolitan District Railway and the London General Omnibus Company, Ltd., London, Eng., is planning to make a visit to this country this winter. He expects to sail from England on the *Lusitania* on Nov. 22. It is probable that he will be accompanied by Sir Guy Granet, general manager of the Midland Railway; Mr. Thomas Jowett, a prominent steel manufacturer in England, and others. They will remain in this country some time.

Mr. Richard Yates has been appointed a member of the Railroad & Warehouse Commission of Illinois. This board will be succeeded on Dec. 31, 1913, by the State Public Utilities Commission of Illinois, and Mr. Yates will probably be appointed a member of the new commission. It is provided in the law that not more than three of the five members of the Public Utilities Commission shall belong to any one political party. The present administration of the State of Illinois is Democratic, so it is assumed that Governor Dunne will appoint three Democratic members. Mr. Yates is a Republican. He was Governor of Illinois from 1901 to 1905.

Mr. N. B. Rhoads, until recently editor of the Waycross *Morning Herald,* has been appointed general manager of the Waycross Street & Suburban Railway, Waycross, Ga., a new position created by the directors, the position of superintendent having been abolished. Mr. Rhoads has filled positions from motorman to manager since he started in the railway business a number of years ago with the Richmond Traction Company. From Richmond he went to Savannah, where he was assistant superintendent of the Savannah Electric Company. In Key West, Fla., Mr. Rhoads was superintendent of transportation, and at Beaumont, Tex., he was manager.

Mr. D. C. Peck, whose appointment as general freight agent of the Shore Line Electric Railway, Norwich, Conn., was noted recently in the Electric Railway Journal, entered railway work some twelve years ago with the Central Vermont Railway in Norwich, Conn., in a clerical position. He served the company as billing clerk, cashier and acting agent for about four years. He next entered the employ of the Norwich & New York Propeller Company, operating steamboats between New York and New London, as New York agent. After serving in that capacity for two years he was transferred to New London, Conn. During Mr. Peck's six years' work at New London as agent for the Norwich & New York Propeller Company the business of the company was more than doubled.

Mr. Fletcher H. Sillick has been appointed comptroller of the Hudson & Manhattan Railroad, New York, N. Y., in place of Mr. Hamilton S. Corwin, resigned. Mr. Sillick began his business career in 1896, when he became associated with the Cooke Locomotive Works, Paterson, N. J. When this company was merged with the American Locomotive Company in 1900, he was employed as shop accountant at the Dickson Works, Scranton, Pa. Between 1902 and 1905 he was connected with the Pittsburgh Works of the American Locomotive Company. At the end of that time he became accountant for the Hudson Companies, the builders of the Hudson tunnels. When the Hudson & Manhattan Railroad was formed in 1907 Mr. Sillick was made auditor, and he remained in that capacity until his present appointment.

Mr. C. Nesbitt Duffy, whose retirement as vice-president and comptroller of The Milwaukee Electric Railway & Light Company, Milwaukee, Wis., to become vice-president and general manager of the Manila Electric Railroad & Light Company, Manila, P. I., was noted in the Electric Railway Journal of Nov. 8, 1913, was the guest at a banquet given by members of the Round Table at the Milwaukee Athletic Club on the evening of Nov. 6. Mr. Duffy was presented with a gold watch, the gift of the organization. In accepting the gift Mr. Duffy said that he had enjoyed his connection with the company at Milwaukee more than any other period of his life. The work had been pleasant and he had taken a great interest in it. Best of all had been

the kindred feeling of the Milwaukee people, the friendships which he had made similar to those with the gentlemen at the dinner. Mr. Duffy explained that he was leaving Milwaukee because he was a victim of the wanderlust, and cited his periods of service in different parts of the United States and in Mexico and South America. The *Evening Wisconsin* said editorially of Mr. Duffy in its issue of Nov. 3, 1913: "Milwaukeeans who have come into touch with Mr. Duffy during the seven years of his residence in this city will not wonder at the call he has received to go higher in the profession to which he has devoted his unusual talents, but they will be sorry that his advancement takes him away from Milwaukee. This city will lose a whole-souled, genial gentleman and public-spirited citizen." Mr. Duffy was the guest of honor at a banquet at the Hotel Pfister on Nov. 7. More than seventy-five friends of Mr. Duffy were present. Mr. S. F. Bower acted as chairman. Among those who expressed their regrets at the departure of Mr. Duffy were Messrs. Patrick T. Bowler, Hans J. Meyer, R. B. Stearns, George Allison and S. B. Way. A farewell address to Mr. Duffy, written by Mr. Ernest Gonzenbach, who found he could not be present, was read by Mr. S. S. Tatium. Mr. Duffy reached New York on Nov. 9 for a final conference with officials of the J. G. White Management Corporation before commencing his journey to Manila. He returned to Milwaukee on Nov. 13 and planned to leave there for St. Louis on Nov. 18. After a few days at St. Louis and Mexico, Mo., he will go on to San Francisco, reaching that city on Nov. 25 or two days before sailing. According to the present plan Mr. Duffy expects to reach Manila before Christmas.

Mr. Henry A. Blair, whose election to the position of president of the Chicago (Ill.) Railways in addition to that of chairman of the board was noted in the ELECTRIC RAILWAY JOURNAL of Nov. 8, 1913, will, it is expected, under the plans for the unified operation of the systems of the Chicago Railways and the Chicago City Railway, be elected chairman of the board of control of seven members which will have charge of the operation of the properties. Under the unification scheme as now proposed the board of control will consist of four representatives of the Chicago Railways and three representatives of the Chicago City Railway. These two companies are the only surface railways which operate in the city proper. Mr. Blair has long been connected with the Chicago Railways as chairman of the board of directors. He is one of the trustees and a member of the governing and the executive committees of the Chicago Elevated Railways, a voluntary association formed in 1911 to acquire control of the South Side Elevated Railroad, Metropolitan West Side Elevated Railway, Northwestern Elevated Railroad and Chicago & Oak Park Elevated Railroad. The Chicago Railways and the Chicago City Railway, of which companies it is expected Mr. Blair will become chairman of the board of control under the unification, operate together about 775 miles of track and 3320 cars. As stated in the ELECTRIC RAILWAY JOURNAL of Nov. 8, 1913, Mr. Blair was born at Michigan City, Ind., in July, 1852. He was educated at Williston Seminary, Easthampton, Mass. He began his business career in the Merchants' National Bank, Chicago, of which his father was founder. Subsequently he was elected vice-president of the bank, continuing in that capacity until 1902, when the bank was consolidated with the Corn Exchange National Bank. In addition to his railway connections Mr. Blair is vice-president of the Illinois Trust & Savings Bank, director of the Union Trust Company, Calumet & Chicago Canal & Dock Company, Elgin National Watch Company and the Commonwealth Edison Company, Chicago.

H. A. Blair

Construction News

Construction News Notes are classified under each heading alphabetically by States.

An asterisk (*) indicates a project not previously reported.

RECENT INCORPORATIONS

***Electric Short Line Railroad, Phoenix, Ariz.**—Application for a charter has been made by the Electric Short Line Railroad in South Dakota to sell its stock in that State.

***Tampa, Charlotte Harbor & Northern Railroad, Tampa, Fla.**—Application for a charter has been made by this company to build an interurban railway from Tampa to Charlotte Harbor, via Ruskin and the Manatee River section and thence east across the Everglades to a terminal not yet determined upon. Surveys have been begun. Capital stock, $3,000,000. Officers: W. J. Epperson, Bronston, president; W. J. Boling, St. Louis, vice-president; T. C. McEachin, Meredith, secretary and treasurer, and J. B. Walker, New York, chief engineer.

***Tri-City Railway of Illinois, Davenport, Ia.**—Incorporated in Illinois to operate electric railways and other public utilities on the Illinois side of the Mississippi River. Capital stock, $2,500. The ultimate capitalization will be $2,000,000 or $3,000,000. Incorporators: Joseph F. Porter, Davenport, president of the Tri-City Railway & Light Company, Davenport, Ia.; H. E. Weeks, secretary of the Tri-City Railway & Light Company, Davenport, and J. G. Huntoon, Davenport.

FRANCHISES

Fairfield, Conn.—The Connecticut Company has asked the Council for permission to relay track at all curves on its line between Grasmere and Southport.

Idaho Falls, Idaho.—The Idaho Electric Railway has received a fifty-year franchise from the County Commissioners in Bingham County for a double-track line across all county highways.

Belleville, Ill.—The East St. Louis & Suburban Railway has asked the Council for a new twenty-year franchise in Belleville. The local franchise will expire in five years. The company asks a renewal for twenty years, for which it offers to extend the local lines to given points, build a $3,000 waiting room on the public square and put the tracks of the line in the rock road strip in the center of the road under the boulevard type of construction.

Centralia, Ill.—The Centralia & Central City Traction Company has received a twenty-year franchise from the Council in Centralia. The franchise was granted on the condition that the line shall be extended to Sandoval.

Mount Vernon, Ill.—The Mount Vernon Traction Company has received a sixty-day extension of its franchise in which to begin the construction of its line at the east end of Broadway in Mount Vernon.

Neodesha, Kan.—The Independence, Neodesha & Topeka Traction Company has received a twenty-year franchise from the Council in Neodesha. This 17-mile line will connect Neodesha, Independence, Altoona and Topeka. W. N. Ness, general manager. [E. R. J., Nov. 8, '13.]

Chicopee, Mass.—The Holyoke Street Railway has asked the Council for a franchise for an extension on Sheridan Street.

Westfield, Mass.—The Springfield Street Railway has asked the Council for a franchise to double-track its line on the Springfield highway from the town line to the Lee turnout.

Greenfield, Mich.—Robert Oakman and Leroy M. Gilbert have received a thirty-year franchise from the Council in Greenfield to connect the Hamilton Boulevard extension and the Grand River line. Construction will be begun within a year. It is believed that this crosstown line will eventually be acquired by the Detroit United Railway.

Rochester, N. Y.—The New York State Railways has asked the Common Council for a franchise to double-track Parsells Avenue from a point west of Chamberlain Street and Stout Street in Rochester.

Middletown, Ohio.—The Dayton, Middletown & Cincinnati Electric Railway has asked the Council for a franchise in Middletown.

Quincy, Ohio.—R. O. Marsh, Warsaw, representing the Tri-State Traction Company, Steubenville, has received a franchise from the Council in Quincy. The company also received a franchise from the Council in Hamilton. This is part of a plan to build a 75-mile line between Quincy and Burlington, via Warsaw, Hamilton, Nauvoo and Niota.

***Oregon City, Ore.**—Stephen Carver, Gladstone, has asked the Council for a twenty-five-year franchise in Oregon City.

Portland, Ore.—The Portland Railway, Light & Power Company has asked the Council for a franchise for a cross-town line on the East Side in Portland.

Montreal, Que.—The Montreal & Southern Counties Railway has received permission from the Council to extend its line in Montreal.

Temple, Tex.—The Temple, Northwestern & Gulf Railway has received a franchise from the Council in Temple for entrance to its terminals at Seventh Avenue and A Avenue, in the western part of Temple.

Seattle, Wash.—An ordinance providing for the construction of a second division of the Seattle Municipal Street Railway will be asked at the next meeting of the Council in Seattle. The route will be from Fourth Avenue south to Dearborn Street, thence to Rainier Avenue and paralleling the tracks of the Seattle, Renton & Southern Street Railway to Columbia City.

Seattle, Wash.—The Puget Sound Traction, Light & Power Company has asked the County Commissioners for franchises for extensions of its lines north and south of Seattle. The company has applied to the Board of Public Works for permission to remove and relay tracks in West Forty-fifth Street, Ninth Avenue, N. W., and West Forty-seventh Street between Eighth and Fourteenth Avenues, N. W.

Ceredo, W. Va.—The Ohio Valley Electric Railway has asked the Council for a franchise to double-track its lines in Ceredo and to build a double-track line on Beech Street in Ceredo.

TRACK AND ROADWAY

Fresno, Cal.—Surveys are being made to build an 8-mile line beyond Clovis. Most of the right-of-way has been secured from Fresno to Clovis and 8 miles beyond Clovis to the foothills of the Sierra Nevada Mountains. F. S. Granger, Clovis, is the promoter. [E. R. J., Oct. 25, '13.]

Pacific Electric Railway, Los Angeles, Cal.—Authority has been granted this company to construct its double-track main line at grade across ten streets or public highways between Strawberry Park and Gardena.

Petaluma & Santa Rosa Railway, Petaluma, Cal.—An extension into Occidental is being planned by this company.

Sausalito, Cal.—W. Wesley Hicks, 320 Market Street, San Francisco, Cal., states that he is in no way connected with the San Rafael & San Anselmo Valley Railway, as stated in the Electric Railway Journal of Oct. 4, 1913, page 667. Mr. Hicks is acting as engineer for a proposed 10-mile electric railway which is to extend through and between the towns of Sausalito and Mill Valley. It is proposed to lay 70-lb. rails and install a 1200-volt overhead trolley system. Double-pole construction will be used within the town limits and single-pole and bracket-arm construction between the towns. The franchises which have been secured extend over a period of fifty years. The owners of this new line are business men of San Francisco and Marin County.

Washington Railway & Electric Company, Washington, D. C.—Plans are being made by this company to begin work in the spring on its new line west of Wisconsin Avenue in Washington.

Palatka-Hastings Interurban Railway, Palatka, Fla.—This company states that it has not yet begun work on its 15-mile line between Palatka and Hastings. F. J. Von Angelken, East Palatka, secretary. [E. R. J., March 15, '13.]

Rock Island Southern Railway, Rock Island, Ill.—The Council of Aledo has opened a street in Aledo to be known as Sixth Street, which will make it possible for the company to enter Aledo.

Hutchinson (Kan.) Interurban Railway.—This company announces that it will extend its line into Carey Park in Hutchinson if the city takes over the park, as is contemplated. The extension will follow the river for 1 mile.

Wichita Railroad & Light Company, Wichita, Kan.—This company is asked to consider plans to extend its line to the Orient shops in West Wichita.

Southwestern Traction & Power Company, New Orleans, La.—This company plans to extend its line from New Iberia so as to reach St. Martinsville by Jan. 1.

Detroit (Mich.) United Railway.—This company is asked to consider plans to build a new cross-town line on Forest Street and Warren Street and to extend across the lower section of Detroit.

***Flint, Mich.**—S. O. Landis, Flint, and associates plan to build an electric line between Flint and Long Lakes.

Houghton County Traction Company, Houghton, Mich.—This company is asked to consider plans to extend its lines from the present terminus at Scott Street, Red Jacket, to a point in front of the site of the Colosseum on Red Jacket Road.

Electric Short Line Railroad, Minneapolis, Minn.—This company, which plans to build a line west from Minneapolis, via Marshall, Minn., entering South Dakota and terminating at Brookings, is considering plans to extend the line from Brookings to Madison. W. L. Luce, Minneapolis, president.

Minnesota Central Railway, Minneapolis, Minn.—Surveys will soon be begun by this company through Brainerd and on the Cuyuna Range. E. G. Potter, Minneapolis, president. [E. R. J., Sept. 6, '13.]

Helena Light & Railway Company, Helena, Mont.—This company is asked to extend its East Helena line across the valley to the lake.

New York State Railways, Rochester, N. Y.—Work has been begun by this company double-tracking in Hudson Avenue between Clifford Avenue and Norton Street in Rochester. Stone ballast and wooden ties will be used in place of concrete and steel ties.

Fayetteville Street Railway & Power Company, Fayetteville, N. C.—This company plans to extend its lines to the mill district and the Cape Fear River.

Brantford & Hamilton Electric Railway, Hamilton, Ont.—Plans are being considered by this company to double-track its line between Brantford and Hamilton in the near future.

Ottawa (Ont.) Electric Railway.—In January, 1914, the residents of Eastview will vote upon the question of extending this railway into Eastview. To perfect the scheme, Eastview is prepared to offer the company a bonus of $25,000.

Sandwich, Windsor & Amherstburg Railway, Windsor, Ont.—Plans are being considered by this company to relocate 1 mile of its line and eliminate some of the curves.

Portland, Eugene & Eastern Railway, Portland, Ore.—It is stated that this company, subsidiary of the Southern Pacific Railway, has succeeded in negotiating a loan for the construction of the proposed line from Portland to Salem through Woodburn. The new line will not be built until spring. Robert E. Strahorn, president.

Montreal & Southern Counties Railway, Montreal, Que.—This company has awarded a contract to John Ross, of the Ross & McComb Company, to build a concrete substructure of a bridge to be constructed over the Yamaska River at St. Césaire. The bridge will have four piers and two abutments. It is understood that the Dominion Bridge Company will erect the superstructure.

***Jackson, Tenn.**—Plans are being considered to build an electric railway between Bemis and Jackson. Among those interested are John Williams, John Wisdom and Aaron Tuchfelds.

Nashville Railway & Light Company, Nashville, Tenn.—New rails are being laid by this company on Dederick Street from Third Avenue, North, to the bridge in Nash-

ville. The ties will be embedded in concrete and 105-lb. rails will be laid. Work will soon be begun laying new rails on Cedar Street from Fourth Avenue to Tenth Avenue. Work has been finished on the renewal of the St. Cecilia line in Nashville.

Nashville (Tenn.) Traction Company.—This company has awarded a contract to Westinghouse, Church, Kerr & Company, New York, N. Y., to make surveys and prepare estimates for its projected lines. The company proposes to expend about $250,000 for grading and equipment within the next eighteen months. Walter O. Parmer, Nashville, president. [E. R. J., Nov. 8, '13.]

Nueces Valley, Rio Grande & Gulf Railroad, Belleville, Tex.—This company is in the market for construction equipment to build its 25-mile line along the Nueces River through Simmons and Live Oak. W. A. Malthaei, Belleville, president. [E. R. J., Oct. 18, '13.]

Northern Texas Electric Company, Fort Worth, Tex.—This company plans to double-track its entire line between Fort Worth and Dallas and build a concrete viaduct to span the Trinity River.

Galveston (Tex.) Electric Railway.—Extensions of its lines in Galveston are being planned by this company.

***Temple, Tex.**—Preliminary surveys are being made by S. D. Hanna, Marlin, engineer, to build an electric railway between Marlin and Temple.

Uvalde & Leona Valley Interurban Railway, Uvalde, Tex.—This company will extend its lines east on Main Street to the freight depot of the Galveston, Harrisburg & San Antonio Railroad freight depot in the western part of Uvalde.

Ogden (Utah) Rapid Transit Company.—This company plans to extend its recently completed Twenty-seventh Street line in Ogden.

SHOPS AND BUILDINGS

Southwestern Gas & Electric Company, Texarkana, Ark.—Announcement has been made by this company that work will be begun at once on its new machine shop in Texarkana. The company plans to do all repair work in this shop in the future.

Big Four Electric Railway, Tulare, Cal.—The offices of this company are being moved from Tulare to Visalia.

East St. Louis & Suburban Railway, East St. Louis, Ill.—Work will be begun at once by this company on its new office building on Collinsville Avenue and Main Street in East St. Louis. The headquarters of the East St. Louis Light & Power Company, a subsidiary of the railway company, will also be in the new building.

Evanston (Ill.) Traction Company.—This company has recently purchased a tract of land on Central Street in Evanston on which it plans to build a carhouse. The structure will have a capacity of sixteen cars and will contain a small office.

Illinois Traction System, Peoria, Ill.—This company has renewed its lease for ten years on the Chisholm Building at Bloomington, which is used for a passenger station. Some improvements will be made soon.

Indianapolis & Cincinnati Traction Company, Indianapolis, Ind.—This company has been asked to consider plans to build a new passenger station at Gwynneville.

Hattiesburg (Miss.) Traction Company.—This company has opened its new office building on West Pine Street in Hattiesburg.

Toledo, Fostoria & Findlay Railway, Fostoria, Ohio.—This company and the Western Ohio Railway have leased the Niles block on South Main Street in Findlay and will remove the Union Interurban station from its present location three blocks further south. The Toledo, Bowling Green & Southern Traction Company will also join them. Plans are being considered by the companies to build a new freight depot in Findlay.

Dallas (Tex.) Consolidated Electric Street Railway.—Work has been begun by this company at Elm Street and Peak Street in the city of Dallas for its new carhouses. The structure will be one-story, 175 x 180 ft., and of fireproof construction. There will be fourteen tracks leading out of Peak Street into the shops and there will be a number of pits. Machinery will be moved from the company's present repair shops on the south side of Elm Street and much new machinery and equipment will be added. The company's old repair shops will be used for storage purposes.

Seattle (Wash.) Municipal Railway.—The Board of Public Works has awarded the contract for the construction of this company's carhouses and repair shops to the Manhattan Building Company, Seattle. The work entails the expenditure of about $6,000.

POWER HOUSES AND SUBSTATIONS

East St. Louis Light & Suburban Company, East St. Louis, Ill.—This company will add to the power station equipment of the East St. Louis Light & Power Company a 2800-kva, 66,000/2300-volt water-cooled transformer which will be furnished by the General Electric Company.

Centerville Light & Traction Company, Centerville, Ia.—This company is enlarging its power house in Centerville and installing new equipment consisting of a new engine and generator set.

Southwestern Traction & Power Company, New Orleans, La.—Plans are being considered by this company to build a new power house and several substations in the near future.

Bangor Railway & Electric Company, Bangor, Maine.—Construction of the new dam of the Bangor Power Company, at Veazie, Maine, has been completed. The new dam, which is on the Penobscot River, 3 miles above Bangor, Maine, will add 1000 hp to the generating capacity of the power plant and will increase the company's total capacity to 18,700 hp. The new development is constructed entirely of reinforced concrete and steel with a maximum height of 27 ft. The base has a width of 25 ft., tapering to 6 ft. at the summit. A new wheel room has been built adjoining the power station and next year additional equipment will be installed. The old steam plant is retained to supply auxiliary power.

Worcester (Mass.) Consolidated Street Railway.—This company has installed a new 5000-kw turbine at its Millbury power house. This extra power generated in the Millbury plant will be used for auxiliary purposes and to supply the old Charlton power house, which is to be used as a substation.

Menominee & Marinette Light & Traction Company, Menominee, Mich.—This company will place in operation in one of its substations in Menominee a 200-kw two-unit, three-bearing synchronous motor-generator set, switchboard and accessories purchased from the General Electric Company.

Wahpeton-Breckenridge Street Railway, Breckenridge, Minn.—This company has purchased from the General Electric Company one 50-hp, 2300-volt motor for its power house.

Richmond Light & Railroad Company, New York, N. Y.—This company has placed an order for three 1000-kw rotary converters with the General Electric Company.

Montreal & Southern Counties Railway, Montreal, Que.—This company has awarded the contract to the Canadian General Electric Company to equip the substation at Rougemont, Que. The equipment consists of a 300-kw motor-generator set, a bank of transformers, high and low tension switchboard, lightning arresters and switching apparatus.

Greenville, Spartanburg & Anderson Railway, Spartanburg, S. C.—A new three-phase rotary converter which will double the capacity of the plant has been installed by this company in its power house on West Whitner Street, in Anderson.

Bryan & Central Texas Interurban Railway, Bryan, Tex.—During the next thirty days this company plans to build a new power house. It expects to purchase a generator and engine with a capacity of 150 hp.

Ogden (Utah) Rapid Transit Company.—This company is installing transformers and other new equipment at its power station on Washington Avenue in Ogden.

Lynchburg Traction & Light Company, Lynchburg, Va.—This company has installed a 1350-hp unit at its Reusens power house in Lynchburg. The generator for the new unit was installed by the General Electric Company and the additional waterwheel by the S. Morgan Smith Company.

Manufactures and Supplies

ROLLING STOCK

Toronto, Hamilton & Buffalo Railway, Toronto, Ont., it is reported, contemplates using steel gas-electric motor cars on its line between Hamilton and Waterford and between Hamilton and Brantford.

Belt Line Railway Corporation, New York, N. Y., has been authorized by the Public Service Commission of the First District of New York to increase its capital stock to provide funds to cover the cost of the thirty-nine storage battery cars which were ordered from The J. G. Brill Company, as described in the Electric Railway Journal of June 28, 1913.

TRADE NOTES

Westinghouse Machine Company, East Pittsburgh, Pa., has made an appropriation of $125,000 to provide additional facilities, owing to its increasing business.

Cincinnati Car Company, Cincinnati, Ohio, has acquired the Armor Steel Foundry plant and is remodeling it in order to have increased facilities for manufacturing cars.

Dossert & Company, New York, N. Y., have received orders for their connectors from the Lehigh Valley Transit Company, West Penn Railways, Toledo Railways & Light Company, Baltimore & Ohio Railroad and the American Car & Foundry Company.

Railway Utility Company, Chicago, Ill., has appointed Charles A. Eggert sales engineer, with headquarters in Chicago. Mr. Eggert has been with the Consolidated Car Heating Company for the past twelve years. This item is in correction of a trade note which appeared in the Electric Railway Journal of Nov. 8, 1913, and which stated erroneously that Mr. Eggert had been with the Railway Utility Company for the past twelve years.

H. W. Johns-Manville Company, New York, N. Y., has received an order to equip all the trains of the Long Island Railroad with its J-M fire extinguishers. The company has recently put on the market "J-M high temperature cement No. 31," which it is said can be used practically whenever working temperatures range between 1500 deg. and 3100 deg. Fahr. This new material is a dry powder mixture composed of asbestos and other materials of secret preparation. It is mixed with water to the proper consistency (about 18 lb. to 20 lb. of water to 100 lb. of powder) for working like mortar or tamping around molds. The company expects to open a new office and warehouse in its Baltimore branch, owing to increased business.

Keyes Products Company, New York, N. Y., has reconstructed its finishing department at Montville, Conn., which was destroyed by fire in the early part of August. This plant is now in full operation. New machinery has been installed and great improvements have been made for the manufacturing of "Nevasplit" headlining and panels. Orders which have been accumulating during the period of inaction caused by the fire will now be filled and shipped promptly. The company announces that it is placing on the market a non-inflammable "Nevasplit" board, which has all the hardness, strength and water-resisting qualities of the regular board, and in addition acts as an effective barrier against fire. This fireproof board is a non-absorbent non-conductor of heat and is designed for use not only for headlining but for excluding heat and cold in the construction of steel cars.

ADVERTISING LITERATURE

National Scale Company, Chicopee Falls, Mass., has issued two folders, one describing its counting machines, another its National Chapman elevating trucks.

Gilbert & Barker Manufacturing Company, Springfield, Mass., has issued a catalog describing and illustrating its process for burning fuel oil under low pressure.

Cincinnati (Ohio) Milling Machine Company has issued a catalog describing and illustrating its semi-automatic millers with intermittent feed and power quick return.

Universal Trolley Wheel Company, Northampton, Mass., has issued an attractive pamphlet calling special attention to the self-lubricating quality of its universal trolley wheel.

H. W. Johns-Manville Company, New York, N. Y., has issued a catalog describing and illustrating the application of its built-up roofing, prepared roofing, asbestos shingles, waterproofing and mastic flooring.

Davis-Bournonville Company, New York, N. Y., has issued two catalogs, one describing its oxy-acetylene welding and cutting apparatus, the other its oxygraph for cutting steel according to pattern with the oxy-acetylene flame.

Railway & Industrial Engineering Company, Pittsburgh, Pa., has issued a folder describing its simultaneously operated disconnecting switches for indoor and outdoor mounting adapted to all capacities and voltages.

National Tube Company, Pittsburgh, Pa., has issued a circular illustrating its different types of "Kewanee" unions, including the regular octagon, round end, hexagon and M. & F. patterns of this air-tested union with no inserted parts.

Brown Hoisting Machinery Company, Cleveland, Ohio, has issued a catalog describing Brownhoist grab buckets, shovel buckets and various kinds of tubs. Illustrations are shown of the application of these buckets by various companies, among them the Brooklyn Rapid Transit Company, Portland (Ore.) Railway, Light & Power Company and the Cleveland Electric Railway.

Electric Service Supplies Company, Philadelphia, Pa., has recently issued three catalogs. One describes and illustrates various railway devices sold by the company, including Keystone car distinction signs, steel gear cases and trolley catchers. Another catalog describes the essential features embodied in the manufacture of Keystone steel gear cases. A third catalog lists and describes winter railway supplies, such as snow-sweeper rattan, Root track scrapers, adjustable track brushes, Keystone sand driers and track and switch brooms.

NEW PUBLICATION

Elektrische Strassenbahnen und Strassenbahnähnliche Vorort und Uberlandbahnen (Electric Street and Interurban Railways). By Karl Trautvetter. Berlin, 1913: Julius Springer. Size, 6 in. x 9½ in. 240 pages. Price in paper, $2; in cloth, $2.20.

This work is free from lengthy, unnecessary description and the author has succeeded admirably in discussing the engineering features of electric railway work in small compass and with great simplicity. The illustrations, which number 334, appear to be original with very few exceptions. The treatise extends from the preliminary studies and cost estimates through the actual construction of track, line and power installations up to the completely equipped car. The arrangement of the work alone makes it of value to the American electric railway engineer who is familiar with German and who can make proper allowance for German conditions.

The New York, New Haven & Hartford Railroad on Nov. 6 filed its answer to the appeal taken by ex-Governor Bulkeley of Hartford and other stockholders from a decree of the Public Service Commission of Massachusetts authorizing the railroad to issue convertible bonds and also to issue 675,520 additional shares of stock. The company submits that several of the paragraphs contained in the appeal were merely propositions or conclusions of law which do not require to be either admitted or denied. But the respondent submits that the petitioners are not interested parties within the meaning of the law and are not entitled to petition the court under the terms of the act authorizing the Public Service Commission to pass upon the issue of bonds. The answer sets forth that the commission acted lawfully and that its determinations were final and not open to review. On Nov. 11 Judge Sheldon, of the Supreme Court, refused to issue an order restraining the company from issuing the $67,000,000 debenture bonds. It was announced that Judge Sheldon would sit on Nov. 18 at the hearing on the bill in equity appealing from the decision of the commission and to consider the case on its merits. He is expected to refer the case to the full bench for a hearing. It was said that probably there would be no actual presentation of the case before the court until the first week in December.